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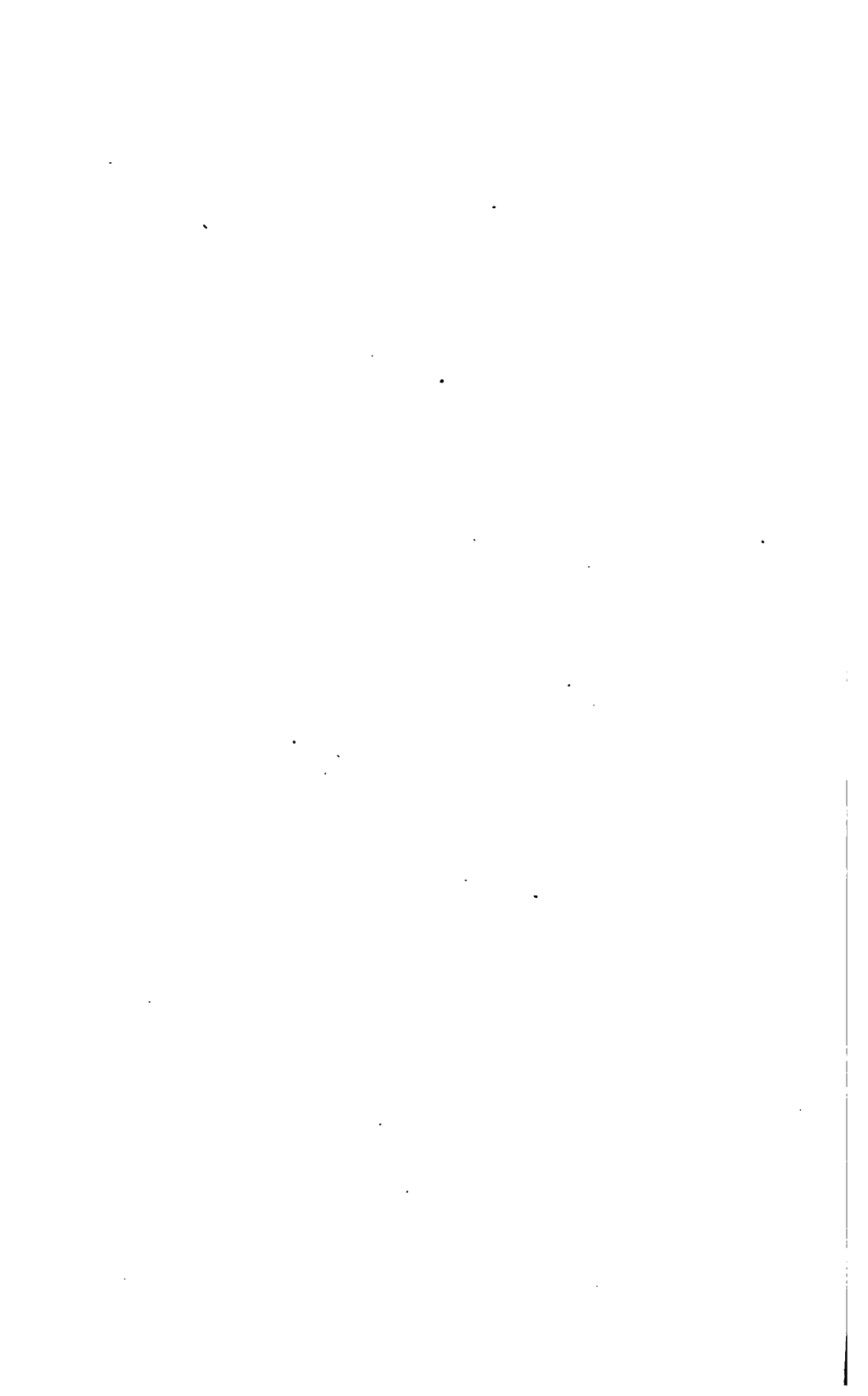
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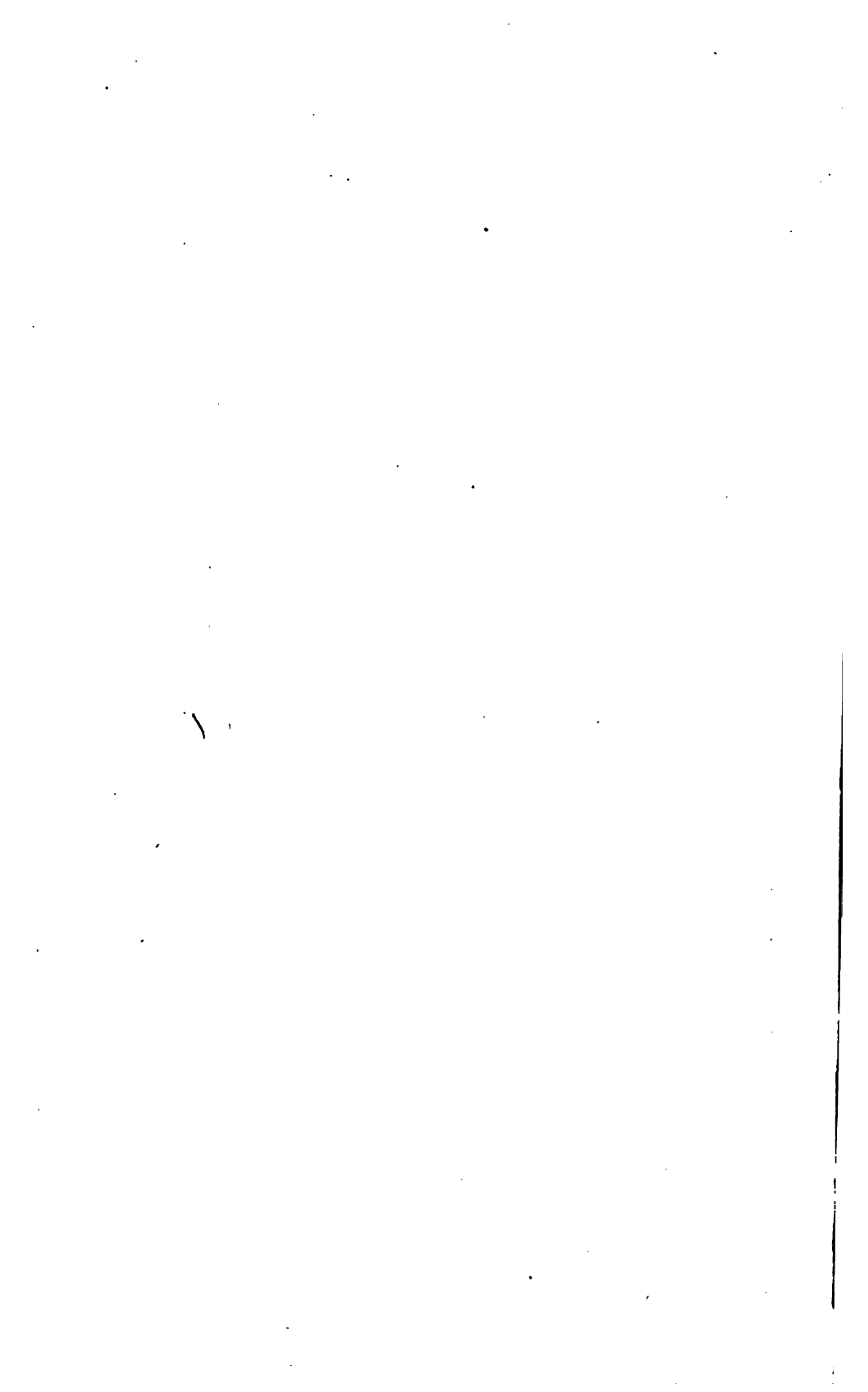
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HEARINGS

BEFORE THE

U. S. H.
COMMITTEE ON RAILWAYS AND CANALS

ON THE BILL

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H. R. 20775

TO ACQUIRE AND ENLARGE THE DELAWARE
AND CHESAPEAKE CANAL



WASHINGTON

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1908

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[H. R. 20775, Sixtieth Congress, first session.]

A BILL To provide for the acquisition and improvement of the Chesapeake and Delaware Canal.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War is hereby authorized and directed to acquire, by purchase or condemnation, full and complete title to the inland waterway known as the Chesapeake and Delaware Canal: *Provided,* That if the works, franchises, properties, claims, and holdings of every kind of the Chesapeake and Delaware Canal Company in and to the said waterway can be acquired by voluntary agreement with the said company for a sum not exceeding two million five hundred and fifteen thousand dollars, the Secretary of War is authorized and directed to purchase the same, and the said sum is hereby appropriated therefor out of any money in the Treasury not otherwise appropriated: *Provided further,* That if the said works, franchises, properties, claims, and holdings can not be acquired by voluntary agreement with the said company the Secretary of War is authorized and directed to institute and carry to completion proceedings for the condemnation thereof. And the sum of five thousand dollars is hereby appropriated to pay the necessary cost of such proceedings; and upon final judgment being entered therein the Secretary of War, if in his opinion the judgment is reasonable, is hereby authorized and directed to draw his warrant on the Treasury for the amount necessary to pay said judgment, which amount is hereby appropriated out of any money in the Treasury not otherwise appropriated.

SEC. 2. That in the event of the purchase or condemnation of the said canal, as provided in section one of this act, the Secretary of War is hereby authorized and directed to maintain and operate said canal as a free and open waterway of the United States, and for the purpose of carrying out the provision of this section the sum of one hundred thousand dollars, or so much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, for said operation and maintenance of said canal until the provisions of section three of this act are carried into effect.

SEC. 3. That when the said canal and appurtenances shall have been acquired by the United States as hereinbefore provided, the Secretary of War shall take charge thereof and proceed to the construction over the route of said waterway a tide-level ship canal with a depth of not less than thirty feet, in accordance with the plan and project formulated by the Commission appointed by the President in pursuance of joint resolution of Congress approved June twenty-eighth, nineteen hundred and six, and set forth in Senate Document Numbered Two hundred and fifteen, Fifty-ninth Congress, second session; and any additional land or other property that may be needed for, or in connection with, the construction and operation of said canal shall be acquired by the Secretary of War in the manner prescribed in section one of this act for the acquisition of the property and franchises of the said Chesapeake and Delaware Canal Company: *Provided,* That for beginning the construction of the said canal, including the acquisition of additional land or other property as aforesaid, the sum of one million dollars is hereby appropriated out of any money in the Treasury not otherwise appropriated, and the Secretary of War is authorized to enter into a contract or contracts for the completion of the work, to be paid for as appropriations may from time to time be made by Congress, not to exceed in the aggregate the sum of sixteen million three hundred and fifteen thousand dollars, exclusive of the amounts herein appropriated.

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TO ACQUIRE AND ENLARGE THE DELAWARE AND CHESAPEAKE CANAL.

HOUSE OF REPRESENTATIVES,
COMMITTEE ON RAILWAYS AND CANALS.

The committee met at 1.30 p. m., Hon. James H. Davidson in the chair.

STATEMENT OF CONGRESSMAN HIRAM R. BURTON, OF DELAWARE.

Mr. BURTON. Mr. Chairman, House bill No. 20775 is a bill to provide for the acquisition and improvement of the Chesapeake and Delaware Canal. Probably most of you are familiar with the fact that a resolution at the first session of the Fifty-ninth Congress authorized the President to appoint a commission, which made a thorough investigation of all this matter and made an exhaustive report, copies of which we have here. The project, while we have only represented here three States, Pennsylvania, Delaware, and Maryland, can not be looked upon as a matter of local importance. The subject is one of great national interest and importance. I believe that as an artery of commerce it will be one of the most useful and one of the short links that makes a long chain that will be of great benefit to this country in many ways. In addition to that, as an adjunct to our coast defenses I think that canal would be worth more than four monster battle ships. It would put the League Island Navy-Yard, with all the shipbuilding plants on the Delaware River, within a few hours of Baltimore and the national capital, and the matter of quickly transferring the naval fleet from the waters of the Delaware to the waters of the Chesapeake might possibly amount to a great deal in the future. In addition to that, the risk of the run for a naval fleet from New York to the cape of the Delaware is insignificant compared with the risk that they would encounter between the capes of Delaware and Cape Henry. This canal would enable our Navy to transfer a fleet from New York, as well as from Philadelphia, to the waters of the Chesapeake to protect Baltimore and Washington in a few hours, without any risk as compared with two or three days in going around the capes.

Now, while Delaware has taken a particular interest in this link, which is only a matter of improvement of a canal for about 14 miles, connecting the Delaware with the great waters of the Chesapeake, as I say, our State is not any more interested in it than any other State on the Atlantic seaboard, or in fact any State in the whole Union.

So, Mr. Chairman, this delegation has come down to ask the Committee on Railways and Canals to consider this bill and make a most favorable report, and I have the pleasure of introducing to you Mr. McClean, the chairman of the Wilmington Board of Trade, which comes here with a delegation from their organization, and ex-Senator Higgins, of Delaware, who is also a member of the board of trade and a man well known, and all of these gentlemen will be introduced as they come up, and I would suggest that the first man to speak on this would be ex-Senator Higgins, of Delaware.

STATEMENT OF EX-SENATOR ANTHONY HIGGINS, OF DELAWARE.

Mr. HIGGINS. Mr. Chairman, this committee has already acted upon this proposition, and in such a deliberate manner as to put upon the record of Congress all the substantial and important facts that are involved in its consideration. It really needs no argument, therefore, before the committee to obtain their affirmative judgment upon the importance of the construction by the Government of the ship canal uniting the Chesapeake and Delaware bays, and of recommending present action upon it by this Congress in the adoption of the bill that has been introduced by Congressman Burton, and which is the subject now pending at the present hearing. The interesting thing to us is to know that the jurisdiction of this matter peculiarly rests with this committee. This is a canal. This is a committee on canals, and therefore your recommendation ought to put it upon the Calendar in a way that would bring it before Congress for action.

A resolution has been adopted by the Senate authorizing a survey of the entire Atlantic coast waterways, such as would constitute, when constructed, a continuous route through Cape Cod to Florida. No survey for this purpose will be needed upon the Chesapeake and Delaware Canal project. I want to say that it has been surveyed—not to death; I trust it is to life—but there were at least eight or ten surveys of the various points on the peninsula, where the rivers and estuaries from either side approach so nearly as to constitute a possible route across the peninsula. Finally, the whole bunch of them was put before a commission, under authority of Congress, of which Admiral Dewey was a member, and they made a report recommending the Chesapeake and Delaware route as the desirable one. As the present bill recites, the House resolution, approved June 28, 1906, and reported in Senate Document No. 215, Fifty-ninth Congress, second session, there was authorized a special commission to again consider the relative value of the Chesapeake and Delaware routes, known as the Back Creek route or one of the present canal and one as the Sassafra route, and also to estimate what would be the cost of the construction of such a canal, and the price that ought to be paid for the existing canal. The pending bill is one authorizing the United States to acquire the existing canal, either by purchase or by condemnation.

The commission, of which General Agnus, of Baltimore, was the chairman, reported that the sum for which it should be acquired should not exceed \$2,515,000, and that if it could not be acquired by consent and by purchase, that then condemnation proceedings should be authorized by the bill, so as to secure its acquisition. Mr. Burton handed me, a few moments ago, an amendment which has been pre-

pared under his directions, putting in a change as to the provisions for condemnation. It is, in substance, that jurisdiction shall be given to the district or circuit courts of the United States; that the Secretary of War shall, within thirty days after notice from the Attorney-General, cause such proceedings to be begun, and they shall conform to the provisions of law of the respective States. I would suggest as a subject for further amendment: Provided that, if any State did not have any general statute covering the right of acquisition in such case, that special provision should be put in this bill for it. For instance, I think that Delaware has no statute that would apply.

The CHAIRMAN. Have you not a general statute which describes the proceedings for condemnation?

Mr. HIGGINS. No, sir; we never had any general incorporation act until 1898, when, under an amendment to our constitution, all special acts of incorporation were prohibited, and corporations could only be organized under general incorporation laws, and that bill was passed, and that contains provision for the condemnation of rights of way and all other things necessary for the construction of railroads and of railways, but none for any other purpose—none for canals, and that, in my opinion, would not apply aptly to this, and you would be balked by it if you undertook to rely upon it. Now, therefore, with such a case as that, you would have a bill, I think, that would be effective and would meet the exigencies of the case.

Mr. HARDY. Is there no provision of Federal law for condemnation for Federal purposes?

Mr. HIGGINS. None that will meet this case. The provision of the Federal law is the one that has been followed in the bill—that the proceedings of the Federal courts for Federal purposes shall conform to the State law. It incorporates a supposed State law, but if the State law does not exist there is a *causus omisus*. Now, Mr. Chairman, what is to me the important subject requiring consideration here is whether there is any reason why this committee shall not favorably report that bill, and is there any reason why Congress should not enact it? Because if you before the session is over pass the resolution which has already been adopted by the Senate, authorizing a through survey from the north to the south along the coast I submit that the proposition of that survey constitutes no valid objections to the proposed action of this bill. You have the route recommended, and you have a complete and thorough survey made, not merely of the topography of the ground, so as to show the proper route, but one carefully made by the Agnus Commission of the borings and everything which led up to what that canal was in its construction. A canal of 35 feet—I think the instruction was for 35 feet—would cost \$22,000,000. One for 30 feet would cost about \$17,000,000, and both of those sums would be plus; that is, some sum above \$22,000,000 and some sum above \$17,000,000, but not to exceed that.

Now, the survey under the Senate resolution would probably take a very considerable time to carry out. My information is that there has been made no survey by the Federal Government over the route of the Delaware and Raritan Canal through New Jersey. There has been State surveys, but of course they would not answer this purpose. That is nearly 20 miles long, and it would doubtless take a very considerable time, and it involves a longer and larger proposition; but if it were made we are only where you are now. Where shall we

begin? And I submit to this committee that Congress in its wisdom, the Chief of Engineers in his discretion, the Secretary of War in his recommendations, the whole country in its acquiescence, ought to agree that the first step to be taken is the opening of the Chesapeake and Delaware Canal. It is not the only one, but the first one, to which the United States ever gave its support. It to-day is the owner, I think, of a large bulk of the stock of the present canal company, \$450,000, and has received the active attention of the Federal authorities long before that time. No other canal in all the lists has such a vital effect and relation to national defense as this does.

Whether it be necessary for the national defense that we should have a canal that would carry battle ships or not, the use that was made of it during the civil war in making possible all of the military operations upon the Chesapeake Bay, making the Potomac a possible base of operations and the line between the two conflicting sections in the war between the States, manifests its enormous importance in that respect. But it is the shortest route. It collects the largest interests. It would connect the commerce of Baltimore and Philadelphia between Baltimore, Washington, Newport News, Norfolk, and all the vast commerce leading up from the West and South with that of the Delaware, and all that comes down through Pennsylvania and New Jersey on the other side. It is of enormous importance to Baltimore in a shorter route to the ocean. It is a missing link between the North and the South. It is the one that can be done the quickest, the soonest, and when done it helps either end. I do not see how it can receive the jealousy, the objection, or the antagonism of the other relative sections to the north and to the south. This construction would be the start for each and all of them. It would make a beginning that would lead up to the whole grand system, one, Mr. Chairman—and I think when I have said this that I have concluded all I need to say, and need take no more of your time—one that has received a most impressive demonstration of the support of the people of the United States.

I never have known of any two gatherings that exceeded in their depth of interest or the importance of what was concerned than the inland waterways conference at Philadelphia, on the 19th and 20th of November last, and the original Congress of Rivers and Harbors, which convened on the 4th, 5th, and 6th of December last. The Congress of Rivers and Harbors was begun in 1904. That movement was initiated then. It has gone forward with great momentum. It reaches over the whole interior Mississippi Valley. It reaches to the Pacific coast and to the Lakes, but as they approached this great Congress in December, unexpectedly there grew up a sudden, as a summer thunderstorm, but as strong as a storm with a northeast wind, a conference in Philadelphia for the construction of an inland waterway along the Atlantic coast, and we came under the wire just in time. But back of our unanimous and concentrated movement we felt behind us the whole force of the cannon, and I say now that if the wishes of these people are carried out—the whole American people—Congress will delay no longer in initiating this great movement.

One word only, in addition. Of all the things that occurred in those two meetings none were more impressive, no single utterance was so impressive, as that of Mr. James J. Hill, the great railroad

owner and constructor. It was a declaration of the absolute necessity of the opening of these waterways to meet the requirements of the commerce of the United States. Just at this time it is under depression. Railroad cars for a while by the hundreds of thousand are laid on the tracks, but the congestion that the railroads were suffering from is not forgotten. This depression will soon disappear, and Congress will be reflected upon and complained of if it shall not take immediate steps in the initiation of the construction of the inland waterways which will meet the requirements of the American commerce when it shall so speedily rise again. I thank you very much.

Mr. BURTON. Now, Mr. Chairman, we will hear from Hon. J. Hampton Moore, of Pennsylvania, who will speak for the great State of Pennsylvania and its interests.

STATEMENT OF J. HAMPTON MOORE, OF PHILADELPHIA, PA.

Mr. MOORE. Mr. Chairman and gentlemen of the committee, it is not my purpose to appear as an advocate of any particular project this morning. My position as president of the Atlantic Deeper Inland Waterways Association, however, compels me to take an interest in this bill. The association was formed at the great conference in Philadelphia, to which Senator Higgins has just so eloquently referred. It was formed to advocate a general line of waterways from New England to Florida. In pursuance of its action, and as the result of conferences of Members of Congress along the line of the Atlantic coast, a bill has been introduced contemplating a survey for a continuous chain of inland waterways from Boston to Beaufort, and that has been supplemented by another bill which proposes to continue the survey from Beaufort, N. C., south to Key West. The advantages of such a chain have been extolled by Senator Higgins in his address, and to what he has said may be added the expression of one who has traveled recently from the northern to the southern lines of the chain as showing the intense interest of the great proportion of the American people affected along the Atlantic seaboard. There are thirty millions of people, we calculate, who are directly interested in the proposed inland Atlantic waterways. Nowhere from Boston to Miami, Fla., since the formation of the Atlantic Deeper Inland Waterways Association has there been anything but an increasing and intensified interest in the development of waterways as an incentive to commerce, to manufactories, to agriculture, and as a relief as against a repetition of the congestion of railroads which occurred in this country last summer.

The bill which is now before you is one which contemplates the actual taking over of the Chesapeake and Delaware canals. Against that bill I dare not say anything. In its favor, as the official head of the organization which contemplates a general movement, I may not appear as an advocate. I am thoroughly in accord, however, with the suggestion of Senator Higgins that Congress must make a beginning in this great inland waterway chain. This section of the country, without prejudice to the Middle West, or to any other section of the country, has been aroused and will be still further aroused to the great importance of the chain, and any link that can be put in advance of any other link will be hailed as a sign of

progress in the direction to which all of the minds of the thirty millions of people are directed.

The naval significance of the Chesapeake and Delaware Canal has been referred to, and is no small part of the argument in its favor. However, if I should begin to enter upon a discussion of its merits, either commercial, agricultural, or from a military view point, perhaps I would begin to throw into this meeting some of the enthusiasm that has been displayed elsewhere and that I hope to display hereafter in visiting various sections of this coast and various points to be affected by this chain of inland waterways. I prefer rather, therefore, after this general introduction, to say that as a Member of Congress from Pennsylvania I am here to present two members, two representatives of that State, who are thoroughly posted, both upon the commercial, the engineering, and the military side of the proposition as it is affected by the bill introduced by my colleague, Doctor Burton, of Delaware. One of these gentlemen is Mr. Thomas Martindale, a foremost citizen of Philadelphia, intensely interested in all works of a public character and well qualified to speak upon the commercial side of this question. The other is Prof. Louis M. Haupt, who for many years has devoted his time and his energy, and in fact who has devoted his life to the cause of deeper waterways in this country, for whom I shall ask a hearing upon the engineering side of the problem. If you have no objection and it does not break into Doctor Burton's programme, I should like to have Mr. Thomas Martindale present his side of the question now, especially in view of the fact that he is obliged to make a train for Philadelphia this afternoon.

Mr. BURTON. Mr. Martindale is on the list as the next speaker, and I will therefore introduce Mr. Thomas Martindale, of Philadelphia.

The CHAIRMAN. I would just like to suggest, gentlemen, that in addition to the commercial phases of this proposition, which I think are very important, I would like to have some one best qualified follow up the inquiry of the ownership of the Delaware and Chesapeake Canal and find out who owns the stock, and see if there can be any cooperation between the States and the Government involved in this question.

STATEMENT OF THOMAS MARTINDALE, ESQ., OF PHILADELPHIA.

Mr. MARTINDALE. Mr. Chairman and gentlemen, I have the honor to represent one of the largest, if not the largest, business organizations on this continent, the Trades League of Philadelphia. I also speak as vice-president of the New York and Philadelphia Ship Canal Commission, organized in 1894, and which made a thorough and complete survey for a new route for a canal across from Raritan Bay to the Delaware River.

The Trades League of Philadelphia has since its inception in 1891, been a strong advocate of interior waterways development and has repeatedly indorsed all movements for the condemnation of the Delaware and Chesapeake Canal, and likewise for the condemnation of the Delaware and Raritan Canal. I listened with a great deal of interest to the address of Colonel Goodyear this forenoon in describing the benefits that have accrued to the whole country at large by the building of the Erie Canal, and particularly the city of New York; and if you will apply that same argument that has been made to the

Erie Canal to what would accrue to the country at large, and particularly to the country through which these two waterways would run, if these two canals were condemned and enlarged and improved by the Government, you would practically have a lengthening of the Erie Canal by something like 180 miles; and freight that originates in Chicago by water could be transported and delivered to the doors of the Baltimore merchant as well as the Philadelphia merchant at probably less than half the cost it takes now. That is one of the strongest arguments I can present to you as business men.

Now, as a business man myself I want to give you one or two illustrations, to bring it right down to a fine point, as showing the difference that exists between the traffic of heavy freight out of Philadelphia and into Philadelphia, out of Baltimore and into Baltimore, and of that of New York aided by the Erie Canal. Some few years since, for instance, I happened to be in St. Louis for the first and only time in my life. I visited some of the big houses in my own trade, the grocery trade, and among them one man said, "Do you come here to buy or to sell?" As a matter of fact I went there to make an address. I did not get the floor until 3 o'clock in the morning, and then I decided I would not take it. So the address which I had prepared still remains unborn and undelivered; but, however, I said to the gentleman, "My firm is a very large dealer in gallon-can goods, fruits and vegetables, and we are also large importers and dealers in tea. Now, I will either buy or sell either of those products in St. Louis, if I can make any money by buying from you; or if I can make anything by selling to you I will also be glad to do that." It came about that there was nothing they wanted to buy, but there was a lot they would like to sell, and so in a very few minutes I had picked out in canned goods something like two carloads.

Now, I said it all depends upon the freight as to whether I can purchase these goods, because it was rather geographical lines to ship this class of goods from St. Louis to Philadelphia. He said, "The rates are 45 cents on canned goods." And I said, "We can not do a thing." "Hold on," he said, "I said the rate was 45 cents. Wait until we see how much better we can get than that." So in less than five minutes he asked four or five or six freight agents, who came right into his office, and they commenced to figure on this lot of freight, and to run it up. He said finally, "Well, the best we can do, and I think that ought to satisfy you, is a rate of 18 cents per hundred pounds and 1½ cents per hundred pounds for crossing the East St. Louis bridge." That gave me a rate of 19½ cents. I said that that was all right; that I would take the lot of goods, and asked if I could buy anything more in St. Louis, and put it on the same bill of lading at the same rate of freight, and they said "Certainly," and so I purchased probably another carload, and brought the goods to Philadelphia, and made a profit on them.

Now then, contrast the difference between our situation in Philadelphia and yours, Doctor Burton, in Delaware. It is well enough to get freight from there, because there is a competition of something, twenty or twenty-five initial lines all narrowed down to two; but now you start at the other end of the problem, and you start with two lines, and therefore no matter how many carloads of freight you can sell, there is only one rate of freight you can get, and that rate of freight in a great many instances is more than the traffic will bear.

Some years since I had the honor of a lengthy interview as a member of the committee with the president of the Pennsylvania Railroad, taking up that very argument, in favor of the condemnation of the Chesapeake and Delaware Canal, and in favor of the condemnation of the Delaware and Raritan Canal, controlled, at least, by the Pennsylvania Railroad. We made the argument to the president of the Pennsylvania Railroad that at that time—and it is still true now, that was in 1898—that they were not making enough money to pay their maintenance charges on the Delaware and Raritan, and that the interests account for their barges on that canal is the old Camden-Amboy lease for nine hundred and ninety-nine years is carried at 10 per cent on an investment of \$5,000,000. In other words, the interest account is \$500,000 per year. Now, that interest is lost, and it did not then, and I presume that is the case now, make their maintenance charges. So I said, "There are quite a number of classes of freight that you can not carry because the rates are prohibitive." "Well," he said, "give me one." I said, "I will give you several." I said, "Take railroad ties." That business initiates principally in Fredericksburg, Va.

"Take your rate through the Delaware and Raritan and the Delaware and Chesapeake, the same, for delivering ties from Fredericksburg, Va., into the city of New York." He called for a freight superintendent by the name of Shipley, and Mr. Shipley in a very few minutes gave the rate at 55 cents per tie for sawn ties delivered in New York and 60 cents, if my memory serves me right, for hewn ties originating in Fredericksburg. I said, "Now, Mr. Thompson, that proves my point. You can buy sawn ties at 55 cents and you can buy hewn ties at from 62 to 65 cents, and therefore the traffic will not bear the freight that you put upon it. Now, I can give you cut stone, dressed stone, and quite a number of other items that simply go to complete the picture." The Spanish-American war was then in progress, and we made a further argument that it would be the politic thing to do to get the Government to condemn the canal and deepen it, and in case of a prolonged war to use it as a naval defense. Mr. Thompson was very much impressed with our arguments, and said that if the canal could be segregated from their lease, from the old Camden-Amboy Railroad system, he would be very glad to consider it. But it was found that it could not be segregated, and therefore the canal is still run in a haphazard way without adding enough, as I said before, to pay the maintenance expenses.

Only on Wednesday a writer for a prominent magazine was making a tour through that canal, and was going to make a tour through the Delaware and Chesapeake Canal and going to continue on down to the Dismal Swamp Canal to write an illustrated article, and so I took lunch with him and asked him what he had met in the way of commerce in the Delaware and Raritan on his way through. He said he had not met anything of much account, or to be exact, that they had met two barges and two small pleasure boats in a trip of 44 miles. Now, the Delaware and Raritan Canal is 44 miles long—

The CHAIRMAN. That strikes the Delaware River at Trenton?

Mr. MARTINDALE. A little below Trenton. It is 44 miles long and enters the Raritan River a short distance above there, to the left, as you go to New York, of this tremendous stone bridge that has been erected by the Pennsylvania to cross that river, and it is fed by an

aqueduct that takes the water from 10 miles up the Delaware River. The highest cut, I think, is 71 feet.

Now, the commission, of which I was vice-president, made a very careful survey, the consulting engineer being Major Hutton, of the Government Department, and the engineer in charge of surveys being my colleague, Professor Haupt, and they showed that the canal could be dug across that territory, which would only be 31.1 miles long.

Mr. WHEELER. That is the Delaware and Raritan?

Mr. MARTINDALE. Yes; at a very moderate cost. Now, having gotten out the survey, as chairman of the executive committee, I thought it right to codify the laws in regard to ship canals that are now on the statute books of New Jersey, and so I sent up to an ex-judge in Trenton, and had the laws codified, and we found this the law—

Mr. WHEELER. Where is the Delaware and Raritan with reference to the Chesapeake and Delaware?

Mr. MARTINDALE. The Chesapeake and Delaware is something like 50 miles below Philadelphia, and the Raritan comes in about 30 miles north of Philadelphia.

Mr. WHEELER. It is not shown on this map we have here.

Mr. MARTINDALE. No, sir. Now, we found this law, Mr. Chairman and gentlemen, and which is still on the statute books of New Jersey. There is a tremendously long preamble—I never saw as long a one in my life—reciting under what conditions a ship canal or other canal could be built within the confines of the State of New Jersey, and after this long preamble, which would take twenty minutes to read, then comes the proviso. First, it was provided that no ship canal or other canal can be built within the confines of the State of New Jersey until the affirmative vote shall be obtained of three-fourths of the residents through which the said canal should pass, and, secondly, that it shall not go over or under any existing line of railway, without having first had the consent in writing of the officials of that company—and we would have to go under and over the railroad twice—and provided, third, that it shall not be longer than 3 miles nor wider than 100 feet at the top. [Laughter.]

The CHAIRMAN. You say that that law is still on the statute books of New Jersey?

Mr. MARTINDALE. That is still on the statute books of New Jersey. But during the legislature before this last one, which has just adjourned, an act was passed repealing that law, and for some reason or other the governor did not sign it.

Senator DU PONT. Was that Governor Fort or his predecessor?

Mr. MARTINDALE. That was his predecessor. Now, we found that condition existing, and it seemed a hopeless task to get that bill repealed at that time—this was in 1895—and then prosecute by individual enterprise the building of a canal, which ought to be done, across the Delaware and Raritan Peninsula.

Now, therefore, the Trades League, first of all, stands for and advocates the condemnation of the Delaware and Raritan Canal on the same terms in its effect as you have here in this bill of Congressman Burton, the amount, of course, being different, and I have reason to believe from what Mr. Thompson said to me at that time—

Mr. Thompson, as you know, is now deceased—but he said he could see no objection at all to it from his standpoint.

Mr. BURTON. You mean Mr. Frank Thompson?

Mr. MARTINDALE. Yes.

Mr. BURTON. President of the Pennsylvania Railroad?

Mr. MARTINDALE. Yes, sir. He said he could see no objections to allowing the Government to do what we wanted it to do, provided, as I have said before, that this canal could be segregated from the lease; and, as I have told you, it could not be done, excepting, of course, the Government exercised the right of eminent domain. Now, I have an idea that the Pennsylvania Railroad would not interpose any objection to a condemnation proceeding, particularly as the tract of land through which it runs—and if you will let your mind glance over it on the run from Trenton to New Brunswick, it is nearly all through marshy, boggy, and swampy land, and that tract of land on both sides of the track would, of course, become a populous, extended village, giving a tremendous amount of local traffic, where nothing comes from it directly now.

Now, as to this Chesapeake and Delaware Canal, I have gone through it four times, and I can not conceive of any greater benefit that could be conferred upon not only the residents and the business people interested at both ends and along its side, but to the country at large, than to pass this bill which Congressman Burton has introduced and make that the opening wedge, the entering wedge, of a system that will reach from Cape Cod down to Florida, if you will.

At the present time in Philadelphia we, as business men, are handicapped by rates of freight both in and out, having an all-rail route; and take the item of marble dust for an illustration, for the city of Philadelphia makes more of that than any other city probably in the world. In the olden times, you know, it was the proper thing to have marble steps, marble mantles, marble window sills, and marble everything, and the consequence was that there was an enormous amount of marble sawed up, and of course the marble dust sold for making soda water and other things, and the rate on it to Chicago is 16 cents a hundred pounds. It is a very heavy item and it won't bear the cost of the freight, and therefore that business is done by the Hudson River. Newburgh, on the Hudson, for instance, does a very large business in it.

Now, take Philadelphia in my own business. If I should sell 10 or 20 carloads of canned goods for shipment to Chicago or St. Louis, the lowest rate I could get would be 16 cents per hundred pounds. Now, the same class of goods can be shipped from New York oftentimes at 8 cents a hundred pounds, and generally at 10.

The CHAIRMAN. Is that by rail.

Mr. MARTINDALE. By rail and canal.

The CHAIRMAN. Now, take your rates to Chicago. Is that an all-rail route?

Mr. MARTINDALE. That is an all-rail route. Rail and lake does not get us anything below 16 cents.

The CHAIRMAN. Either for all rail or rail and lake?

Mr. MARTINDALE. No.

The CHAIRMAN. Now, what is the New York rate?

Mr. MARTINDALE. At times you can get as low a rate as 8 cents.

Senator DU PONT. Is that by canal?

Mr. MARTINDALE. By canal and lake, and then as low as 10½ cents by canal and rail. Now, as a business man you can readily see what an embargo that is upon business; and if these two systems were built and deepened as they should be, the business men of Baltimore would have the benefits of the Erie Canal given to them by lengthening it, as I have said before, 180 miles, and probably an increased rate of, say, 2 cents at the most, because the great cost in carrying freight is really the breakage of bulk.

Now, then, to sum up in a few words what I have said, I would say that the Trades League heartily indorses this proposition which is now before you, and we do hope, Mr. Chairman, and gentlemen, that in addition to that you will go a little bit further and make provision also for the Delaware and Raritan. There is no time to be lost. The country is groaning under freights that they can not well pay, and the two together would form a link that would bring Baltimore and the southern part of the country below it, as well as to the distance between Baltimore and New York City.

I am much obliged, gentlemen, for your kind attention.

The CHAIRMAN. Just a question. Is it not possible for you to ship by water from Philadelphia to New York and transfer to the canal barge?

Mr. MARTINDALE. You mean going around—

The CHAIRMAN. To Chicago?

Mr. MARTINDALE. But then the loading and the unloading, Mr. Chairman, destroys all the advantages there is. In other words, the Clyde Line charges practically 10 cents per hundred pounds for carrying freight 90 miles, and they come outside. Now, you can bring freight from Duluth down to Buffalo for something like 2 cents per hundred pounds, and I have been told it has been delivered as low as one cent and a quarter, from Duluth, which is more than 10 times the distance.

The CHAIRMAN. That has to be transferred at Buffalo?

Mr. MARTINDALE. Yes; There is not any way you can get around this dilemma. We have not got an open door to the West and neither has Baltimore. We have got a closed door, and the Trades League wants to open that door, and hopes that this committee will help to open it.

Mr. HARDY. Did you speak about the freight on the Delaware and Raritan Canal having partially or entirely ceased to exist?

Mr. MARTINDALE. I am glad that you mentioned that, Congressman. When the canal ceased to be owned by private parties—the last year it was operated independently, it made \$923,000 net and carried nearly four million tons of merchandise, and the last report I saw from that canal it had less than 600,000 tons, and the tolls had been put up so high, as I said before, that the freight can not bear it. It is 44 miles long. Now, the Clyde Line used to pay about \$70,000 for taking their barges through carrying freight to and from New York to Philadelphia. Now they have abandoned the canal and go outside. Another thing, the canal is said to be 7 feet deep. Their canal is like a chain, the strength of it is guided by the weakest link, and the canal's depth is guided by the shoalest place, and I am informed that there are shoal places that shoal it down to 5½ feet, and therefore it will bear very little traffic of any weight.

Mr. HARDY. What was the cause of the utter abandonment of that canal?

Mr. MARTINDALE. The cause was the disposition on the part of that railroad, the Pennsylvania Railroad, and other railroads, to do away with canal traffic and put all the burden of the traffic onto the rail.

Mr. HARDY. Now that is the very question I have been asking. Have you not run across that everywhere, a disposition to kill your water transportation by railroad obstruction?

Mr. MARTINDALE. Almost everywhere, Congressman, except in England and the southern part of France and Germany.

Mr. HARDY. I am talking about our own country.

Mr. MARTINDALE. Yes; that is right. To carry that illustration a little further, above all things that made Philadelphia a manufacturing city was the close proximity to the anthracite coal field, some 90 miles away in round numbers, and the Schuylkill Navigation Company brought down coal in barges through the Schuylkill Canal and delivered the coal there for 70 cents a ton, and then carried that coal up in the same barges and took it through the Delaware and Raritan Canal and delivered it in New York for an additional 30 cents. That would be a dollar a ton in New York. Now, before the anthracite strike in 1893, which lessened the consumption of anthracite coal in the big cities, because men adapted their furnaces to soft coal, New York was using 6,000,000 tons a year and Philadelphia about 5,000,000 tons. The present rate is \$1.70 and \$1.75 from the mines to Philadelphia on anthracite coal. Now the Schuylkill Navigation Company's canal has been allowed to go into the same condition as the Delaware and Raritan Canal. Now if that were taken up by the Government and opened to the public, coal could be brought down at a profit at 70 cents a ton, and there would be a saving to Philadelphia of \$1 a ton or \$5,000,000 a year, presuming that the consumption was as much as it was before 1903. It would be a saving to New York of about \$4,000,000, because the saving would be less to New York per ton than to us, because the freight rate is practically the same on anthracite coal now as it is to Philadelphia.

Mr. HARDY. What canal is that you are speaking of?

Mr. MARTINDALE. The Schuylkill Navigation Company's canal.

Mr. HARDY. What is the length of that?

Mr. MARTINDALE. About 108 miles. It taps the anthracite coal field.

Mr. HARDY. And the death of that canal has raised your freight rates from \$1 to \$1.70?

Mr. MARTINDALE. No; that was the New York rate.

Mr. HARDY. But that has raised your freight rate 70 cents—to \$1.70 and \$1.75?

Mr. MARTINDALE. Yes; that is right.

The CHAIRMAN. If those canals were opened up to the coal fields, is it not a fact that the coal mines are practically owned by the railroad people?

Mr. MARTINDALE. To a large extent, Mr. Chairman, and that will be another problem to be surmounted. Of course, under the bill of last year, compelling them to separate and sell their coal mines, that may not be the condition.

Mr. HARDY. They would have a subcompany for that. You have got to get at that by some other legislation; but that is another question.

Mr. MARTINDALE. What built Philadelphia up was cheap coal. Now we have lost the great advantage of cheap coal, and New York has lost it, and as a matter of fact Buffalo gets coal just as cheap, 400 miles away, as we do in Philadelphia, 90 miles away.

The CHAIRMAN. Let me ask you about the ownership of that Raritan and Delaware Canal, although that is outside of this hearing. We understand that you put it up as a connecting proposition.

Mr. MARTINDALE. Yes, sir.

The CHAIRMAN. Who owns the stock of the Delaware and Raritan Canal?

Mr. MARTINDALE. It is the old Camden and Amboy lease at 10 per cent. The Pennsylvania has agreed to lease it for nine hundred and ninety-nine years at 10 per cent.

The CHAIRMAN. Now, they lease it from whom—the Pennsylvania Railroad leases it from whom?

Mr. MARTINDALE. From the Camden and Amboy.

The CHAIRMAN. The Camden and Amboy Railroad Company?

Mr. MARTINDALE. Yes, sir.

The CHAIRMAN. Are they the owners of the leasehold?

Mr. MARTINDALE. They are the owners. They acquired it. I was reading over this morning where a battle royal took place between John Stephens and a Mr. Stockton, one advocating the waterways and the other the rails, and they finally joined together.

The CHAIRMAN. There is no element of State ownership in that, either Pennsylvania or New Jersey?

Mr. MARTINDALE. Not that I know of.

Mr. HARDY. As I understand you, though, the Pennsylvania has bought that out and paid the royalty.

Mr. MARTINDALE. No; they have not bought it.

Mr. HARDY. I mean leased it on a royalty of 10 per cent and then proceeded to let it do no business.

Mr. MARTINDALE. That is practically the case. Of course, there is a business, but it is so little you can not call it any.

Mr. BURTON. Mr. Chairman, we expected to have with us to-day General Agnus, the chairman of that commission, but for some reason he did not come; but his friend, Mr. Meekins, is here and will probably explain why General Agnus could not come, and will tell us something about the detail work of the commission, which surveyed that canal. I will say to you gentlemen that Mr. Meekins was secretary of the General Agnus Commission.

STATEMENT OF LYNN R. MEEKINS, ESQ.

Mr. MEEKINS. Mr. Chairman, I am requested by General Agnus to bring his very keen regrets. He had a positive engagement at 12 o'clock to-day, and did not hear of this hearing in time to make arrangements to attend.

Mr. BURTON. With Mr. Meekins's permission we will hear from Senator du Pont for a few minutes at this time.

STATEMENT OF SENATOR DU PONT, OF DELAWARE.

Senator DU PONT. I will say, generally, gentlemen, that I am very strongly in favor of this proposition, and the proposed legislation. I think that the two salient points are the questions of the

inability, under normal times of prosperity, to move the enormous volumes of freight which are required, and which the necessities and the business of the country extends to them, and even if they were able to, even if the immense expenditures necessary to carry the freight as it was a year ago, were provided, I think in ten years' time or fifteen years' time, at most, you will be confronted with the same proposition. The absolute inability of the railroads to accommodate themselves to the growing commerce of this country, and it is evident to my mind that the heavy classes of freight, such as railroad ties, marble and stone, and all those things, must eventually in this country be carried by water, as they are in the principal countries in Europe. That is evident, and I think that is one of the crucial questions involved. Furthermore, I think that the questions of national defense cuts no mean and insignificant figure. A suitable waterway that would permit the passage of vessels of war between the waters of the Delaware and the waters of the Chesapeake, and if possible between the waters of the Delaware and the waters of New York Harbor, would add immeasurably to our capacity of defense by the possibility of the prompt transference from one point to another, and particularly so if there was a hostile fleet off our shores. The money that is laid and is fully expended for the purpose of peace and for the purpose of war. To my mind, those are the two strong considerations that should be borne in mind in discussing this problem. I had not anticipated that I should be called upon to address you, and have not devoted any particular attention to the matter, so that I will not speak at greater length; but it seems to me a very self-evident proposition that the internal waterways is a matter of capital importance, and one that should be taken up. It not only affects the whole Atlantic coast, but it is equally important in the western country. The commerce of the Mississippi and the communication of the Mississippi and the Gulf with the Great Lakes is of far-reaching importance to every city of the United States.

STATEMENT OF LYNN R. MEEKINS, ESQ.—Continued.

Mr. MEEKINS. Mr. Chairman, General Agnus has requested me to say to you that the evidences that have to come to him and to other members of the commission since they made their report all tend to show the intense feeling for this canal throughout our section. After a hearing in Baltimore, at which one gentleman made a speech in opposition to the canal, an impression spread that there was a hostile sentiment in Maryland; but such a thing does not exist at all. The State is most cordially in favor of it.

The general points have been covered here, but one which might be emphasized is the large local traffic that will be served. The Delaware and Chesapeake bays have a coast line of 2,500 miles. They have 500 tributaries of one sort or another, and there are 10,000 vessels on those two bays. They have a commerce approaching \$100,000,000 a year, a large part of which would be served by this waterway. The point that the commission tried to develop was that the Chesapeake and Delaware Canal was the chief link in the chain of waterways along the Atlantic coast—a link that has been surveyed, as Senator Higgins said, almost to death, some twenty-seven times, and which has been indorsed by the commission, by the States, and by the different business bodies.

The chairman asked about the ownership of this canal. The original cost was two and a quarter millions, of which the United States paid \$450,000, Pennsylvania \$100,000, Maryland \$50,000, and Delaware \$25,000. The stock, as it was reported to us, was distributed among 340 stockholders, but we could find no value to it. No dividend has been paid on it for over thirty years. The bonds are owned by between five and six hundred persons, mostly in and around Philadelphia. The indebtedness of the canal to the United States is somewhere between seven and eight hundred thousand dollars.

The CHAIRMAN. What is the bonded indebtedness?

Mr. MEEKINS. It is all in this report—two million six hundred and some odd thousand dollars.

Mr. BIRDSALL. How is the present value of the canal and its property arrived at?

Mr. MEEKINS. By 5 per cent on the earning value of the canal.

Mr. HARDY. You say that that canal pays no dividend to the stockholders at all?

Mr. MEEKINS. It has not paid any for thirty years.

Mr. HARDY. I would like to ask whether or not it is true that the rates from Philadelphia to Baltimore points on that waterway are reduced excessively and the intermediate rates are raised higher on the railroads; do you know?

Mr. MEEKINS. I do not know.

Mr. HARDY. Why is it that that does not pay as a water route?

Mr. MEEKINS. The canal has been changed little in fifty years.

Mr. HARDY. What is its depth?

Mr. MEEKINS. Nine feet and a fraction.

Mr. WHEELER. That is its present depth?

Mr. MEEKINS. Yes, sir.

Mr. HARDY. And yet it does not pay a dividend?

Mr. MEEKINS. No.

Mr. HARDY. And you do not know whether they have two rates—from Baltimore to Philadelphia very cheap, and off the water town rates very high?

Mr. MEEKINS. They have a regular line of steamers between the two cities?

Mr. WILLIAM ERNEST MULLEN. I think I can answer that. Through rates to Philadelphia to-day are 2 cents per hundred less than the rail rates, and that is made in connection with the Pennsylvania Railroad Company. On all points on the canal they have what we term excessive rates. The local rates are very high.

Mr. HARDY. Then the Philadelphia and Baltimore Railroad competes with the Philadelphia and Baltimore Railway for cheap rates, but when they get off the waterways they raise the rates?

Mr. MULLEN. Yes. One reason why that canal does not pay a dividend, the bonded indebtedness of the canal, I believe, was increased through a misappropriation of money of \$600,000, which is brought out in the report. That is now a debt of the canal—a fraudulent issue of bonds.

Mr. MEEKINS. As Judge Gray said, this is one proposition against which there is no argument. Every report and every condition favor the deepening of this channel of 13 miles to serve the two great sec-

tions of the country. It does not mean the mere connection for this local trade; it does not mean only the naval use, but it means the reaching of the south which produces two billions of dollars of raw material. It means the shipping of coal south of this latitude up to the north at a great deal cheaper rate. Some of you have been at Hampton Roads. Sometimes fifty or sixty or seventy vessels are storm bound there for two or three weeks, which means an enormous loss. This canal would provide a safe course for them right up to Philadelphia, or out of the Delaware Capes, and they could thus escape the worst part of the coast.

The CHAIRMAN. With your familiarity with the report, I would like to ask you to speak on the question as to the depth of this canal, whether for all commercial purposes and ordinary coast defenses a canal of 25 feet would not be as useful and less expensive than a canal of 35 feet. I take it that it is not the anticipation that any Atlantic coast inland waterway will be anywhere near 20 feet in depth from Boston to Florida. I do not know what they propose particularly, but as an artery of commerce I questioned the advisability of attempting to build a canal there that would float the largest battle ship and have the same depth of water as the Baltimore Harbor or the New York or Boston harbors. Whatever commerce is going to go through here, seems to me might be carried on a 20-foot depth at much less cost of construction to the Government. I want information on that.

Mr. MEEKINS. Your information is correct, Mr. Chairman. The instructions to this commission were to estimate for a waterway sufficient for the largest vessel afloat, and that meant 35 feet. The commission went beyond its instructions and made calculations for 30 feet, which made a difference of about \$6,000,000; but wherever the commissioners held hearings, especially in Philadelphia, they found a very robust sentiment for a 16-foot canal as a beginning, giving all the facilities needed for the present actual coastwise trade, especially the lumber trade, the heavy freight trade. General Agnus said this morning, when we were discussing the matter, that the sentiment is growing for a 16-foot canal. A 20-foot would be better, but a 16-foot would serve most of the present needs of coastwise commerce.

Mr. CHANEY. It would not enable us to make use of it for military purposes.

Mr. MEEKINS. Only for small ships.

The CHAIRMAN. As I understand it, the heaviest battle ships only draw about 26 feet. Some of them may be loaded to 27 or 28 feet.

Mr. MEEKINS. But they would need a 30-foot canal, Mr. Chairman.

The CHAIRMAN. Yes; they would want 30 feet. Now I query whether a battle-ship fleet could really make use of this canal as a matter of coast defense—whether it would not be the cruisers and scouts and small class of boats that would make use of it—so that as a matter of coast defense, perhaps, a more shallow draft would answer every purpose. My thought is that the improvement of our inland waterways ought to be worked out upon some general plan, some system by which they will cooperate with each other. Now, New York is deepening the Erie Canal to a 12-foot depth—12 to 14 feet—and this committee reported a bill a few years ago to incorporate a company to build a ship canal from Lake Erie to the Ohio River with a depth of 14 feet. If I remember correctly, the Ohio River is

to be deepened to a 9-foot depth, and any inter-coastal canal along the Atlantic coast probably would not exceed from 9 to 12 feet, and the inter-coastal canal around the coast of Louisiana and Texas won't exceed 9 feet in depth. Now, there is a project for a canal across the State of Florida, and for a canal from the Tennessee to the Ocmulgee River, and also a canal from Toledo to Chicago by way of Fort Wayne. Now, it seems to me to make these canals effective to carry the commerce there ought to be some general system by which they would cooperate with each other, so that freight originating on any inland waterway can be transported without breaking bulk to any inland waterway where the connection is possible to be made.

Mr. MEEKINS. That is a condition that this canal does not meet at present. For instance, take the freight coming from Norfolk. They can bring a larger boat through the canal south of Norfolk than they can take through this Chesapeake and Delaware canal.

Mr. HARDY. What is the depth of the Delaware River from Philadelphia down that canal?

Mr. MEEKINS. It depends upon conditions.

Mr. HARDY. You have got no certain 20-foot depth?

Mr. MEEKINS. Twenty-six feet, I think they claim.

SUPPLEMENTAL STATEMENT OF HON. J. HAMPTON MOORE.

Mr. MOORE. Mr. Chairman, the project for an inland waterway, continuous, provides for a 16-foot depth as a starter. What would pertain to the Florida Canal might not pertain, from a commercial point of view, to the canal across the State of Delaware, and those across the State of New Jersey; but those having in view the general project thought it would be well to have a minimum depth to start with. Consequently, the bill for the general survey provides for a 16-foot depth from Boston to Beaufort. If the engineers should select it as a part of the most available route, it would cover the Ambrose channel in New York, which has reached a depth of 45 feet; it would cover that particular portion of the Delaware River, to which Mr. Hardy referred, between Philadelphia and the opening of the Chesapeake and Delaware Canal, which we are now endeavoring to deepen to 30 feet, which the engineers promise to be deepened to 30 feet before the close of the present session. It does not hold a 30-foot long at mean low tide.

With regard to the Chesapeake and Delaware Canal being deepened beyond 16 feet, I suggest that that would not affect the general proposition at all, because the Chesapeake and Delaware Canal presents certain features of advantage with regard to naval and military expeditions that do not pertain, perhaps, to other sections of the coast. For instance, you would not want to deepen the inland waterways along the coast of Florida from St. Augustine to Miami. You perhaps would not want to deepen that all the way to 16 feet, because the commerce is not there; but are building with a view to the future and according to the necessities of the locality, and I question very much whether the people of Norfolk and Beaufort, N. C., would ask at this time for a depth of 16 feet, and yet we propose to get estimates for 16 feet in the general survey, in order that the entire chain will hold and the system may be worked on lines mutually advantageous. Of course, we are asking for 30 feet and

will ask for 35 feet for the lower Delaware, because the necessities of commerce there require it. This proposition contemplates the opening up by the Government of a little over 13 miles bisecting the State of Delaware and part of the State of Maryland, which saves an outside sailing distance, to leave the railroad question out altogether, of 340 miles, giving an opportunity to this commerce from the South of this raw material seeking the factories of the North, and of the finished product of the North finding an outlet to the South, instead of being held up in Hampton Roads to await the passage of storm, to go up by way of this inland passage at a depth sufficient, and which may be standardized at least 16 feet.

Mr. WHEELER. Is this canal only 13 miles in length?

Mr. MOORE. Yes.

Mr. WHEELER. Have you any locks in it?

Mr. MOORE. Three.

Mr. MEEKINS. In Baltimore we were getting a magnificent channel approach 35 feet deep. The Chesapeake and Delaware Canal Commission's estimates are not merely for the 13 miles of canal, but are to connect the deep water of the Delaware with the deep water of the Chesapeake Bay, taking in that whole course. The \$18,000,000 for a 30-foot canal does not mean the digging of the canal alone, but going all the way down Back Creek, Elk River, and Chesapeake Bay with a broad channel 30 feet deep or deeper.

Thirty-five years ago the commerce of this little Chesapeake and Delaware Canal yielded over \$400,000. By the management which it has had this business has dwindled much below \$200,000 and is dwindling. If the Government should take hold of it and open it, it would easily be worth millions of dollars to the transportation of the two bays and this coast.

The CHAIRMAN. Do you understand that if the Government should condemn and take this property it would expect to reimburse the States of Pennsylvania and Maryland?

Mr. MEEKINS. No; I think not. We communicated with the States. Maryland's board of public works passed resolutions that they would request the legislature to turn over to the Government Maryland's interest, and I have not the remotest doubt but that Pennsylvania and Delaware would do the same.

The CHAIRMAN. You did not get any official information from those States?

Mr. MEEKINS. The legislature of each would have to take action on that.

Mr. WHEELER. What has Pennsylvania in it?

Mr. MEEKINS. One hundred thousand dollars, I think.

Mr. BURTON. I do not think there would be any difficulty about that.

Mr. MEEKINS. None whatever.

Mr. BURTON. We have with us here Professor Haupt, of Philadelphia, whom we would like to hear from, and who can give you not only some of the engineering features, but some of the other great features. But I want to say right here that a 14-foot or even a 12-foot canal along the coast would be ample for commercial purposes. We would of course be satisfied, and those engaged in the inland waterways would be glad to have even 14 feet in this one link, but this is so short, and we look upon it as so important, that we

think it should be more than that depth and that it should be at least—if it were 25 feet the rise of the tide, Captain, would make it what?

Captain REYBOLT. Between 30 and 35.

The CHAIRMAN. My remarks, Doctor, were not intended with any idea of holding it down to anything like 16 feet, but it was a question between 20 and 25, as it might involve several million dollars, and that would be a matter of discussion and study.

Mr. BURTON. Yes; but only constructed in such a manner that it could be deepened whenever necessary. That is, I think, a very wise suggestion, and Major Flagler said that the one unpardonable sin committed in the resolution which was passed by this committee and which was passed by the House two years ago was that it required a depth of 35 feet, sufficient for the largest ship afloat, and that it should have been made for a lesser depth; that the commission should have been allowed some discretion in what they would recommend.

The CHAIRMAN. I think it was the intention of the committee that all we wanted was an estimate as to what it would cost. We expected they would exercise some discretion as to what a more shallow depth would cost.

Mr. BURTON. Yes; they did, I think, Mr. Chairman, because every 5 feet you add to the depth of the canal you run the cost up very much higher in proportion. I am very glad that the committee here will consider that phase of it, and now Professor Haupt will give you some valuable information.

STATEMENT OF PROF. LOUIS M. HAUPT.

Mr. HAUPT. Mr. Chairman and members of the committee, I want to thank you personally for the honor which I have of appearing before you to-day. As you well know, I have had that pleasure a number of times, and I do not want to repeat myself by going over a large number of propositions which might very properly be submitted to you for your careful consideration. The economics of the canal, its commercial advantages, its strategic position, have all been pretty fully placed before you. But it seems to me we are still in a condition of expectancy, and I feel a good deal like some of our *prima donnas*, I hope this will be my appearance for the last time, positively for the last time, because I hope you will take some action which will make it unnecessary for the commercial bodies to come before you and urge the importance of such a project as this. Mr. Martindale, Senator Higgins, and others, and yourself, Mr. Chairman, as well as Mr. Moore, have given you a large number of factors which bear upon the importance of the problem and its great necessities. This problem is over a hundred years old, has been conceived and partially wrought out, in consequence of the destruction of our National Capitol in 1813 because of the absence of the canal, and it was practically the preservation of our country during the civil war. The commercial necessities are even greater than that.

We have great possibilities in this country. The resources of it are enormous. The greatest coal field in the whole East lies in West Virginia, Pennsylvania, North Carolina, Tennessee, and Kentucky, and that body of coal land of the bituminous region is practically inaccessible except by rail, with the exception, perhaps, of the Great

Kanawha improvement, leading down the Ohio and then to the Mississippi basin. This little chart here, which was prepared for the Lake Erie and Ohio Canal, will give perhaps a better idea of the relation of that coal belt to the whole industrial, manufacturing, and commercial interests of the East, better than anything that can be shown, and you will see that there is no possibility of getting that coal, which is the energy which energizes and gives vitality to all industrial interests, except by railroads, and you will remember that Judge Cowan, a receiver of the Baltimore and Ohio, stated here a few years ago that if the Delaware and Chesapeake Canal were opened and made free, so that vessels of 16 feet draft could pass through there, that they could then deliver their coal in New England with one car instead of two and a half cars. It would require one car to do the work of two and a half cars, as they would then simply haul to Baltimore and then transship from that point.

The CHAIRMAN. I think he said in that hearing that they would send 7,000,000 tons of coal the first year that it was put in use.

Mr. HAUPT. Not the first year. He said at least 2,000,000, and in a very short time, say in five years, there would be fully 7,000,000 tons of coal going out from this Cumberland district through Baltimore and to all the coast-line cities along the Atlantic. That is a factor which I think can not be controverted, and the importance of which will appeal to your imagination as a method of developing our industrial resources and increasing our foreign products. There are a great many phases to this question, and it seems to me that the one that confronts us the most severely at the present time is the one of action, or what might be called practical politics, so as to get some enabling legislation, so that this work may go ahead. Our good friend Mr. Moore has been extremely energetic in pushing the whole waterways improvement. There must be a point of beginning, and it seems to me this is the first bridge to be thrown down. If this link is opened, it will immediately demand the opening of the others. Philadelphia is peculiarly situated in eastern Pennsylvania, with its enormous output and resources, in this respect, that it has practically no competition by rail or water. We have three toll gates on the three routes. The Chesapeake and Delaware, owned by a private corporation, and which is not a transferring company, but merely a company for the maintenance of that canal; the Delaware and Raritan, which is, as you have heard, under the lease of the Pennsylvania Railroad for nine hundred and ninety-nine years, and the Schuylkill Navigation Company's canal, under the lease of the Philadelphia and Reading Railroad, so that there is no competition by water or by rail. We have been striving to get a deeper water channel to the sea, and are hoping some of these days to have 30 feet.

Now, with reference to the obstacles that confront the project at the present time from a legislative standpoint, it seems to me that the bill which Doctor Burton has done us all the favor of introducing is one exactly in the right direction. This bill, however, the Mudd bill, for the purchase of this canal after the appraised value had been determined by a commission, and it is to that point particularly that I want to address myself. This bill provides that in case the company declines to accept the appraised value of the works that then the Government shall condemn the canal and proceed to determine its value in the ordinary method by the court, and that, I think, is the most

expeditious method of getting at results, for with reference to the appraised value of the canal as determined by the report, the principal obstacle was, first, in the framing of the original bill creating this commission, where it required that it shall be large enough and have a capacity sufficient to accommodate the largest vessel afloat. I will not go into a history of the Panama Canal to show how that is operating, but it is going to be a very difficult matter for any canal to keep up with the growth of vessels. I think that the bill is handicapped and that we overreached ourselves in that respect in figuring on a 35-foot canal project at the present time, and where the approaches will not permit a vessel of that draft to enter that basin, that it is absolutely futile to undertake it.

The commercial requirements, as you may remember, along this coast, as originated by the convention called in Baltimore in 1871, advocated the enlargement of these coastwise links for local or coastwise purposes, and the Baltimore Chamber of Commerce opposed the ship canal. In fact, there is an act passed by the State of Maryland on record prohibiting the construction of a ship canal across that peninsula. As you know, in your report published a few years ago, there are 25,000,000 tons in sight in each of the bays, making about 50,000,000 registered tons available which would be interchangeable, and that does not include the unregistered tonnage. So that there is an enormous tonnage in sight. In fact, I have often said that I know of no canal on the face of the earth that would pay so well, if it was properly handled and operated on an economical basis.

In the estimate of the commission, I want to call your attention to a few facts, not in the spirit of criticism at all, but in all fairness to all parties, for I do not believe that it is the function of the Government nor the wish of any legislature to take any undue advantage of the owners of that canal. The canal is operated by a corporation, but that corporation does represent vested interests of private parties, and in this estimate on page 7 of the report, Senate document 215, it is stated that for the land damages which will have to be acquired in addition to the land already owned by the canal, the commission estimates 903 acres at \$250 an acre, and 750 acres of forest land at \$100 an acre, and the average estimate of cost per acre is about \$186 for the land outside or beyond the borders of the canal property.

Now, the canal company, in its inventory filed with the commission, estimated on 8,000 acres of land which they put down at about \$50 an acre, and stated that they thought the canal estimate was a fair one. Looking at it from an equitable standpoint we think, in Philadelphia, as members of the Trades League, desiring to have this work pushed as rapidly as possible, that if this \$186,000 is a fair value for land lying beyond the borders of the canal property, that if the canal property were estimated at the same figures, it would increase the value of the land \$1,646,000, which should have gone into the appraised value of the canal company's inventory.

Another item to which I wish to call attention is that of the estimates at the request of the commission by the canal company itself, as I understand, in which they have itemized the amount of excavation already in place, and which will be immediately available, they have estimated it at 15,000,000 cubic yards at 25 cents per cubic yard. That item has been accepted as to quantity but not as to price. The commission has reduced that price to 16 cents. We

think that is entirely too low. No railroad contracts of any consequence are being let for less than from 30 to 60 cents. Municipal works are very much higher than that. The Panama Canal works run up to over 58 cents, with every possible facility for handling material as cheaply as possible. So that by that reduction from 25 to 16 cents, the estimate is cut down 36 per cent or \$1,300,000. The project is cut in the same way some 12½ per cent in this 80,000 linear feet of bank revetment of \$1 a foot. This report states that that is too large an estimate, although admitting that the unit price is correct; but they seem to overlook the fact that there are two sides to the canal, and that there are revetments on each side of the canal. So this is amply within limits, and so without taking up the time of the committee I call attention to those few items in regard to the estimates.

Now, the total of the estimated value of the canal company for its work alone is \$5,348,071. By these reductions made by the Commission and its engineers they reduce that to \$3,708,000, and then a little further on, on page 20, they add this cogent remark:

The Commission is convinced that the value of the property from the point of view, of course, of reproduction, even at its valuation of \$2,708,186, is far too high for the Government to pay.

Now, we respectfully submit that we do not think that that was the province of the Commission, and that it was hardly called upon to express its opinion on the ability of the Government to pay for the property which it found to be worth \$3,708,000 for the work alone, and it is well known to all the gentlemen present that the works and franchises were to be appraised and the franchises are a legitimate part of that appraisement.

Mr. BURTON. How do you get at that price, the work of the canal?

Mr. HAUPT. From the report of the Commission. "Appraisement of canal property."

Mr. BURTON. I repeated your canal's estimate.

Mr. HAUPT. The canal estimate is given in detail. The dry excavation, 50,000,000, at 25 cents, making \$3,750,000, and the dredging 1,435,700 cubic yards, at 16 cents, which is a very fair figure for that kind of work, and 80,000 of bank revetments, at \$1 per foot—

Mr. BURTON. I just wanted to get at that. Then your idea, as I understand from your remarks, is that the estimate of the Commission of the price to be paid for the canal was not large enough.

Mr. HAUPT. Not adequate; yes, sir. I am mentioning this now because I think this is the time to consider it, with this end in view, that if the question is submitted to the Chesapeake and Delaware Company, and its proprietors, that it will only delay the matter to have to take it up from that standpoint, for I have been in pretty close touch with them, and I am sure that they would not accept that and would not feel justified in accepting the price named in the bill as being a complete remuneration for the property.

Mr. CHANEY. That is this amount expressed here on page 20?

Mr. HAUPT. The amount on page 20, \$2,515,000; yes, sir.

Mr. HARDY. In other words, the owners would not take that amount and it would be a matter of condemnation, with a probability of its being much in excess of that.

Mr. HAUPT. Yes; that is the idea, that it is better to proceed to condemn at once than to pass a bill and have to go through this routine again.

The CHAIRMAN. This bill before us does provide for condemnation.

Mr. HAUPT. It does provide for condemnation and that is what I am trying to comment upon. I think Doctor Burton deserves a great deal of commendation for having introduced that amendment.

Mr. WHEELER. Do we understand that this figure is so many cubic yards which they have excavated that you figured should cost so much?

Mr. HAUPT. That is material already taken out of the canal.

Mr. WHEELER. But here is a canal that has not paid anything in thirty years, and they are getting something for it.

Mr. HAUPT. The canal is paying in this way. It has paid and is now paying 5 per cent; it is now paying 4 per cent by consent of the bondholders and placing a little amount in a contingent fund.

Mr. WHEELER. How much, Mr. Haupt?

Mr. HAUPT. It is now about a \$60,000 contingent fund, and when it gets to \$100,000 they expect to return to 5 per cent, which was paid on the stock to the Government as well as the stockholders.

Mr. WHEELER. But for thirty years it has not paid anything.

Mr. MEEKINS. I want to call attention to the discrepancy there about the price of real estate. When the canal puts in 8,000 acres, probably the gentlemen all know that some of the land runs half a mile from the canal. It is a very irregular line of real estate they own along that route; and then the estimates for the land that should be needed were based upon the Government experience around that section of Delaware where they have been doing other construction work.

Mr. HARDY. Will all that amount of land be needed for the actual use of the canal?

Mr. HAUPT. For dumping purposes as well as for excavation. A portion of this canal will be in a deep cut and will have to be excavated, and another large portion of it will be required for dumping this material which comes out of the deep cut into St. Georges Creek basin.

Mr. HARDY. What is the width of this canal?

Mr. HAUPT. At the bottom it is 100 feet in the deep cut, and it will widen out to about 600 feet. We do not realize what a magnificent project this is, and how much it is handicapped by its very magnitude. When the Suez Canal was built there was less than 100,000,000 cubic yards taken out of that entire project, and it cost about \$100,000,000, so that the average cost was \$1 per cubic yard for excavation, and it is a fair basis for roughly getting at the probable cost of the work.

Now, from this report of the Commission, and, as I say, I am not criticising it, but simply stating the facts, a certain number of the details are given in regard to the amount of excavation, beginning at Baltimore and proceeding through to Philadelphia. In other words, it is over 100 miles long, and it is proposed to do that digging by dredging in the open boats and barges, and in some places it is 600 feet wide, and in the canal proper it is about 100 feet in width, and the total amount of excavation for this canal is 94,350,000 cubic yards, or about the same size as the Suez Canal, and next in importance to the Panama Canal. According to this estimate the amount is about \$22,000,000, which I think is wholly inadequate to meet a work of this class.

Now, with reference to the franchises, which are not included in this estimate of the Commission, the Commission virtually finds that the franchise is of no value, because in their recommendation they include the word "franchise" in their findings, and in order to arrive at that conclusion the Commission has taken about thirteen of the older years of this canal as a basis, which were very strenuous years for the canal companies. And these last few years show practically no gain, but if they had taken the history of the canal for the past fifty years they would have found an average increase or net return of about \$48,000 a year; we can say \$50,000 in round numbers. If you capitalize that at 5 per cent it would make a franchise worth a million dollars.

I think those items require very careful consideration, and they aggregate over \$3,000,000, which I believe properly should be added to the work and franchises.

In addition to that, it has been shown that the defenses already in place are available from this northern route, and that was the principal reason for its selection. If a southerly route on the Delaware had been selected the fortifications would have been inferior work and would not have protected this coastwise movement, and would have required two million and a half dollars more to replace them in that position.

Those are some of the factors that must enter into the question of the acquisition of this canal, and I have simply mentioned them here, Mr. Chairman, for the purpose of coming down to the desirability of the passage of this bill of Doctor Burton's, just as soon as it possibly can be done, for the relief of the whole community and for the benefit of the commercial and industrial wealth of the eastern Atlantic seaboard and for the relief of our localities, if you may be pleased to make it so narrow, from these onerous tolls which are being placed upon our manufacturing interests.

Now, there are a great many other thoughts that occur to me, but I do not feel that I am justified in taking up any more time, and if it is agreeable to the chairman I will submit a brief of any further thoughts or analyses of the matter that you may desire.

Mr. WHEELER. It has been stated that there are three locks. Can you give us the size of those locks?

Mr. HAUPT. There is one at Delaware City with a lift of about 6 feet. It is largely a tidal lock. It is about 6 feet, and that lock is sometimes almost submerged by a strong eastern wind. The canal runs on for about five miles and a half to St. Georges, where there is another lift lock of about 10 feet, rising to the summit level, which is about 6 feet above the tide, and that was necessary because of what is called the deep cut, which extends for 3 miles. The canal was cut down to give it a depth of 10 feet, and it is maintained religiously at that draft. Vessels are now going through that, drawing 700 tons, and they hug the canal very closely indeed. There is only a few inches to spare in going through there. The westward lock at Chesapeake City, opening into the Back Creek, has a single lift of 16 feet, and the locks are 220 feet long by 24 feet wide, and of course that depth depends upon their prism of lift and draft.

Mr. WHEELER. Then you have two locks on the east side and one on the west.

Mr. HAUPT. Yes.

Mr. WHEELER. To get that rise you have to use two locks?

Mr. HAUPT. The proposition that appeals to all of the commercial interests of this coast is this, the disposition to do away with all the locks and to take out this summit level, which requires a lift of water pumping, and that is one of the expenses of maintenance, and that is to make the 16-foot waterway sufficiently wide, so that when the time comes that the vessels ever demand it, it can easily be dredged through and deepened to almost any extent.

Mr. WHEELER. What is the material there?

Mr. HAUPT. That has been troublesome, but it is only 3 miles, and with a hydraulic apparatus, and so on, it can be handled, and in the end it will be the cheapest kind of movement and the most expeditious. There are certain advantages in that, and that is the reason this price was made 16 cents. Some of that material will have to be pumped a mile and a half, or else have relay pumps.

Mr. WHEELER. Is it sand, or what is it?

Mr. HAUPT. It is sand and there are some boulders of disintegrated silicious rock. There is a good deal of black material, and it does not stand at the usual slope of $1\frac{1}{2}$ to 1, or a 2 to 1, and the excavations that have taken place there have shown that the actual increase in the cross-section over the theoretical is 66 per cent, and that has already been taken out by the company, and the banks are suitable and require now very little attention to prevent sloughing off.

The CHAIRMAN. What width would you suggest for a canal 16 feet for commercial purposes which could be deepened?

Mr. HAUPT. It ought to be at least 150 feet wide, from the shoalest portion, taking a 16-foot depth, which would admit of a deepening of 8 feet at least for the canal, and that would give you 24 feet with a bottom width of 100 feet, with a very stable slope.

The CHAIRMAN. And without any locks on this canal?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. Without locks what would be the effect, if any, of the tide?

Mr. HAUPT. They would be practically nil, for the reason that the sea level of the Chesapeake Bay and the Delaware River are the same. The tides in the Chesapeake Bay and the Delaware River are about 6 feet and if they were both high at the same time, there would be a difference in level of only 3 feet, which is a very slight difference. The upper Mississippi in many places has a slope in places of a foot to the mile.

The CHAIRMAN. Would that have any current effect?

Mr. HAUPT. There would be no injurious effect. Probably a current of 2 feet per second, or about $1\frac{1}{2}$ miles per hour.

Mr. WHEELER. Would you not still have to have a lock at each end?

Mr. HAUPT. No, sir; just as the Suez Canal. There is sometimes a difference of level of 9 feet, but the movement has never given any trouble.

Mr. BURTON. You spoke a while ago of the inadequacy of the estimate for the canal property. What would you think of substituting the Sassafras route for the canal? Would that be more economical for the Government and be treating these people better?

Mr. HAUPT. No, Doctor; I think there are two points we ought to consider, the principal one, and secondly, the equity in the matter. The Government is also an owner in this property, and it would seem a very great hardship to take this property, or rather to build a rival

canal and make it free, which would absolutely destroy it. It is the old story of the Nicaragua Canal and the Panama Canal. You know the French people did not want us to build the Nicaragua Canal because they would have lost all their investment. But there are certain physical reasons which are very serious. The entrance to the Sassafras—

Mr. HARDY. Excuse me, Professor. Where is the Sassafras route?

Mr. HAUPT. It is right in there. [Indicating on map.] There is a spit of land which makes out to the westward on the west bank of the Sassafras, which is directly opposed to the northwest wind and the boats coming out of the Susquehanna up against that neck of land which is 4 miles in length. Now, to protect that entrance it would be necessary to build a strong breakwater on the opposite side of that channel so as to open the mouth of the Susquehanna. In doing that you have to cross the channel of the Chesapeake, and that is a very serious matter indeed. And, on the Delaware, you would have to build two breakwaters a mile out in order to protect the entrance on that side. Those are very serious obstacles which do not exist at all in the other route. Those are simply physical conditions.

Mr. BURTON. In that matter it would hardly be taking that property for less than these people think it is worth, and possibly would not add a great deal to the cost of construction of a canal across the peninsula, and they would still have their property to use.

Mr. HAUPT. Yes, sir; but they could not charge any tolls and it would be practically useless.

Mr. WHEELER. But it has not paid anything for a great while.

Mr. HAUPT. The other canal, too, would cost a great deal more money, and it would take longer to navigate it as compared with the other. It would have to be fortified, and you have no right of way, and you know nothing about the physical conditions there, but this same difficult stratum runs all the way through that whole peninsula, and so that is an unknown problem.

Mr. BURTON. Was it not the judgment of that commission that the Chesapeake entrance to the Sassafras had some very superior advantages that the other did not possess, in the matter of a deep harbor there?

Mr. HAUPT. I did not discover them in the report, Doctor.

Mr. BURTON. I want to ask you another question in regard to this \$2,515,000. Is not that as much as they are getting a 5 per cent dividend on?

Mr. HAUPT. They are getting a 4 per cent dividend on about \$2,600,000 and a little more than that. They are laying a little something over. This year I understand they have netted about \$68,000. In other words, the canal is doing a larger business and a better business, and I think the statement was made the tonnage had dwindled to about 200,000 tons. That was 700,000 tons.

Mr. BURTON. Perhaps this has called the attention of some of the commercial bodies of the country to its great economy and increased their revenues a little. But you say about \$2,600,000. As I understood you a while ago, the \$600,000 was on account of a case of fraudulent bond issue.

Mr. HAUPT. Yes, sir; by an old secretary, prior to 1886. Those bonds were issued, having been signed by the president, who had confidence in his subordinate officers, and they were taken over.

Mr. BURTON. Then the \$2,515,000 would practically be paying all of the bonds, including the \$600,000.

Mr. HAUPT. Yes, sir.

Mr. BURTON. And they would be getting good money for watered bonds?

Mr. HAUPT. So to speak. Up to that time they were held above par and selling at that in the market.

Mr. MOORE. Professor, this is simply to get some information to help us in a general way, if you are willing to give it. Appreciating the fact that there are army engineers in charge of rivers and harbors work, and there are also civil engineers, and sometimes they do not always agree as to their conclusion, and in view of the fact that a bill has been introduced for a continuous survey along the Atlantic coast, merely for the purpose of information, if you are willing to give it, I should like you to tell this committee your opinion of the most available route across the peninsula of Delaware and Maryland, whether it is the Chesapeake and Delaware Canal or whether it is some other route.

Mr. HAUPT. With pleasure. The project of connecting these two bays, as I have said before, is over a century old, and I have an old map of Delaware which shows four or five different routes investigated in those early days. Now, in those days the people tramped over every foot of the ground and knew exactly what they were doing, and those who had got their experience from the Erie Canal came down and finally selected this as the best of all of them, and I believe that they made no mistake. I am quite familiar with that section of the peninsula and have studied that thoroughly and can heartily indorse the present route as being the best. Now, in constructing the canal, however, I would like to suggest that instead of diverting it and making it a northeasterly direction to the easterly end of it, from the point where the old Dargen Creek crosses under it, it had better be run out nearly straight to a distant point, and that would make it more accessible by the boats coming down the river and the Chesapeake Bay, and make it a little shorter and better, and would not at all interfere with the construction. In fact, it would slightly reduce it and would be a much better location. I do not believe the western end of it can be very materially improved, and there are comparatively few curves on it, and there is ample room on both sides. There is ample room for dumping material, and it would make the most magnificent waterway that I can conceive of.

Mr. HIGGINS. The report of the Agnus commission does carry it below Raritan Point.

Mr. HAUPT. That is the better location.

The present available depth on the Delaware is only 22 feet, so that is another reason why it should not be made 35 feet at the present time.

The CHAIRMAN. I suppose you could gather from the data submitted here as to the cost of dredging to a 35-foot depth in both Delaware Bay and Chesapeake Bay up to where the canal proper commences, and deduct that from the cost for a draft of 20 feet as against 35 feet. Can you give us any information in addition to that, how far out on either side would it be necessary to go for the 20-foot and the 25-foot depth?

Mr. HAUPT. On the easterly side of Delaware Bay, if you would go out at Raritan Point, you would not have to go more than 1,000 feet. The deep water hugs the point closely. In Back Creek you would have to dredge for a 16-foot depth. There would not be more than a mile of dredging all the way to Baltimore for the 16-foot depth. For the 20-foot depth it might be 4 or more miles, but it would be comparatively insignificant. I believe a 16-foot waterway could be built through there, taking out these locks, for \$3,000,000.

The CHAIRMAN. A 16-foot waterway could be built for \$3,000,000 in addition to what we paid for what exists there now.

Mr. HAUPT. Without reference to the franchise and works; yes, sir.

Mr. HIGGINS. I want to say just one word. Mr. James J. Hill, in his address in December, urged that the depth, speaking particularly of the western project, if possible be made 19 feet, for the reason that the greater the depth the deeper the carriage.

The CHAIRMAN. That is undoubtedly true.

Mr. HIGGINS. So when you talk about 9 or 10 or 12 feet, you are leaving out a very important matter.

Mr. HAUPT. It is a well-known adage that the commercial value of a waterway increases as the cube of the depth. So that if you will double an 8-foot waterway you have increased its value eight times and not twice.

Mr. BURTON. You will understand the making of this depth between the Delaware and the Chesapeake bays makes a waterway seven or eight hundred miles long altogether.

Mr. HAUPT. Yes, sir.

Mr. BURTON. And the depth of all that waterway, except that contemplated in this improvement, is at least 25 feet.

Mr. HAUPT. Do you think so, Doctor, for all this distance? After you get above Five Mile bar there are points there which are 9 feet.

Mr. BURTON. Where is that?

Mr. HAUPT. South of Trenton—south of Bordentown.

Mr. BURTON. I mean by the making of this link there is an inland waterway from the capes of the Delaware to the capes of Virginia, Norfolk, and all that, which makes a long line to Baltimore and to Washington, and that really this link in there is the weak link in the present existing chain.

Mr. HAUPT. Absolutely.

Mr. BURTON. And whatever you make this, you have got that depth.

Mr. HAUPT. Yes, sir.

Mr. BURTON. If you make it 20 feet you have a 20-foot waterway from the capes of the Delaware to the capes of Virginia, Norfolk, Baltimore, Washington, and so on, and if you make it 25 feet you have a 25-foot waterway?

Mr. HAUPT. Yes, sir; and you have got the ocean beyond that.

The CHAIRMAN. Professor, would a boat loading at Newport News or Norfolk on a 25-foot keel seek this inland course as against the outward sea course to New York and Boston?

Mr. HAUPT. A sailing vessel would not. A steam vessel would probably do so if there was good water all the way through of 25 feet. Both would try to do so because of the insurance rates. They are said to be double outside.

The CHAIRMAN. On the theory that part of it is outside anyway from the Delaware Bay to Boston, would the insurance be proportionately lessened by taking this inland course?

Mr. HAUPT. It would be, but I doubt if it would affect the Newport News traffic very much, as they would have to make the 60 miles down Delaware Bay to the southward after getting to the Delaware River.

The CHAIRMAN. How about the Baltimore traffic?

Mr. HAUPT. If the Delaware and Raritan Canal was opened they would certainly take the canal; unquestionably.

Mr. BURTON. As a shorter route?

Mr. HAUPT. As a shorter and less expensive route. They would save time and time is the element in transportation.

The CHAIRMAN. Are there any railroads that practically parallel any of these routes?

Mr. HAUPT. Yes, sir; the Baltimore and Ohio, and the Old Philadelphia, Baltimore and Wilmington, and some one asked the question some time ago and it was stated that the coal rates to Baltimore was a certain amount, and the coal rate to Philadelphia is 10 cents higher.

Mr. HARDY. From where?

Mr. HAUPT. From the Cumberland mines on the B. & O. In other words, the railroads were competing with the canal, and carrying coal 90 miles for 10 cents, so as to compete with canal traffic which charged 15. That was some little time ago.

Mr. HARDY. The present rate is the same?

Mr. HAUPT. Yes, sir.

Mr. BURTON. Mr. Chairman, we will now hear from Mr. W. W. Foulkrod, Representative from Pennsylvania, who will say something in regard to this question.

STATEMENT OF HON. W. W. FOULKROD, OF PENNSYLVANIA.

Mr. FOULKROD. Mr. Chairman, I do not believe that I can add anything to what has been said. I was for many years president of the Trades League, and later chairman of the river and harbors committee, which had this matter before it. It seems to me that there has been so much talk and so much discussion of the matter, and so many plans, and a commission was appointed, and everything has literally settled down to the necessity of building this canal, and if I had my way I would say drop all other schemes that you have—I do not mean to do away with them—but to postpone them, and attend to this one particular branch. Here is something where you already have got commerce.

The CHAIRMAN. That does not include, perhaps, the 35-foot Delaware River project.

Mr. FOULKROD. We would have to have that in order to get to this, and we take that as necessarily following, but we have got the 30-foot part of it, I think, pretty well settled. Now, of course, we would not have anything to do with Philadelphia if we had not a 35-foot way in prospect. But it seems to me that what we should do is that here is business already. This is not building a canal or deeping a river in order to make business. The business is there. The business is waiting, and the business is suffering. It seems to me there is no more important

matter that is before the committee or before any of our committees, either by the commercial bodies or Congress, that is as near to us in importance as this work. I believe it would be an enormous paying scheme from the beginning. We have had a trade organization with which I am connected make calculations, and Professor Haupt has spent a large amount of time both for himself and for the Trades League in collecting data of different kinds, and it has all been presented to you at different times, and it is merely repeating things for me to attempt to go over it. But I am satisfied that the enormous tonnage that would at once—you might say the minute the canal is put in order for the work it would be a very profitable, paying operation, both for the different States and for the country at large. I do not believe there is anything further that I could add.

The CHAIRMAN. What do you know of the average depth of commercial vessels operating along the coast?

Mr. FOULKROD. I do not know. I, of course, am always in favor of the deeper canal. I think it is a great mistake for a nation to spend its money and put something that will do, and then there comes a question whether it will answer, and one set of men who have certain business will say, "Yes, 12 feet will answer," and another set of men will say, "No, 14 feet," and some will say, "16." I believe if the Government is going to spend its money it is better to have a deeper canal at all events. It seems to me it is economy in the end, and it settles all questions, because the deeper the canal there is no question then about the largest boats being able to go into it, and sail in it. So that I would very much rather see this canal made 25 feet than anything else.

The CHAIRMAN. That is, than anything less.

Mr. FOULKROD. Yes.

The CHAIRMAN. What do you say further than 25 feet?

Mr. FOULKROD. Then I think it becomes a question as to the amount of money that the Government would want to spend. If the Government was willing to spend the money for 30 feet, then I would say 30 feet by all means. I would go the deeper depth, and nothing but the ability of the Government in not being willing to spend that amount of money at that time would stop me. That is the position I would assume, if I was a member of this committee.

The CHAIRMAN. As a matter of fact, so far as the amount of money taken out of the Treasury is concerned, whether it is two million or four million, it is not very important after all, except to avoid the charge of being wasteful and extravagant. We want a business proposition. I do not believe, if we are going to build this canal—I believe we should make it a business proposition, and have it neither too great nor too small—of being charged with being unreasonable.

Mr. FOULKROD. If I was a member of your committee, that is exactly what I would advocate. If I was a member of this committee and was going to vote on this proposition, I would vote for 30 feet in preference to anything else, and if it appeared to be impossible I would have to be satisfied with 25 feet, but I would take 30 feet in preference to 25.

The CHAIRMAN. You think the difference in cost would not be a waste of the public money?

Mr. FOULKROD. I do not think it should be considered. Here is a great section. Philadelphia alone has a population of nearly a

million and a half people, with manufactories doing a little over \$600,000,000 worth of business. Now, you can figure for yourself what an outlet there is. That has nothing at all to do with that coal tonnage, and all these different matters, but her manufacturing products are over \$600,000,000. Consequently it must appeal to you at once that there must be an immense business that is going out of there, and a waterway will come in for its share. There is no line of vessels that ever came into Philadelphia that ever stopped running for want of business. It was simply about the question of facilities there, on account of the shallow water or something of that nature, but never for want of business. My calculations are based largely upon the fact that if this canal is built it will be a paying proposition from the very hour it is started, because the business of Philadelphia alone is sufficient to make it a profitable operation.

Mr. BURTON. Hereafter we will limit the speakers to five minutes, with your permission, Mr. Chairman.

Mr. HAUPT. May I take one minute in order to answer your question? The Chamber of Commerce of Baltimore issued a statement, which is the only authentic one I could find, to the effect that only 3 per cent of the commerce of that city could go through the canal having a 10-foot draft, and with a canal having a 15-foot draft, 24 per cent, and with a canal having a 20-foot draft, 50 per cent.

Mr. BURTON. Mr. Chairman, I will now introduce a gentleman who was not only raised on the banks of the canal, but who has spent a good deal of his time on the canal, Capt. Phillip Reybolt.

STATEMENT OF CAPT. PHILLIP REYBOLT.

Captain REYBOLT. Mr. Chairman, I do not know that I can add very much to what has been said. I am here to-day representing 10,000 American citizens, and every one with a vote, and ask you not only to report this bill favorably, but to pass it. These men know something about the inland waterways of the country, and the domestic commerce; and while it has been a dream with us for years of landlocked navigation along the Atlantic coast, we believe that this one link is the key to the whole situation. Here are these two great bays with 2,500 miles of shore line and 500 tributary streams, whose total commerce is more than the total foreign commerce of the United States, and shut off by 14 miles. The canal, in its present condition, has outlived its usefulness. To take the statistics of the shipyards of the Atlantic coast, there has not been but two steamers of over 250 tons burden narrow and shoal enough to pass through the canal, and they were built especially for it, as these gentlemen know, and that is one of the reasons there is no commerce going through there now, and the other is that the policy of this canal has been influenced by the Pennsylvania Railroad Company, and you have got to pay a toll of 25 cents a thousand to carry it through that 14 miles and 20 cents a ton on coal. When the consumer should, therefore, have his coal for 75 cents freight, he pays a dollar, and so it goes.

One gentleman asked if there was any railroad paralleling this canal. If you take this map and a map of the Pennsylvania Railroad Company you will find that they have got this whole Chesapeake Bay region from Philadelphia down the peninsula—every rail, every

tie, to Cape Charles, and stretching through from Baltimore and Philadelphia to Richmond, every steamboat line on the eastern shore, every steamboat line on the western shore, and the industries in those two great cities—by the throat, and there will be no relief until you give us a free canal through this peninsula, and then the people themselves will control their own business and not a corporation. And this canal will save property loss from shipwreck. It will protect human life and it will cheapen living. On the one item of coal it will save to the New England manufacturers \$500,000 a year on his steaming coal alone, by saving the tow down the Chesapeake and up the coast, even if you go by way of Cape May, and we believe the time has come now in the economic history of this country when something has got to be cheapened, and that the Government has got to do something to help the people. And when I say people, I mean the wage-earners of this land, and you have got either to give us cheaper freight, or raw material, or lower wages, and you know what lower wages means in this country.

The only way to get cheaper freight is by competition, and the only way under God's heaven you can get competition is on these inland waterways. They are the cheapest means of transportation known to man, and if you will just join them together with Government-owned and free canals your commerce will follow; your mill wheels will hum, and freight rates will adjust themselves without national legislation or Government ownership of the railroads. I think if you will take in this whole situation and what it means to these 12,000,000 of people that this canal is the geographical center of, and the industries, that you will find that it will be a cheap investment for the people of the United States Government if this special canal costs \$30,000,000.

As to the depth, our coastwise vessels draw all the way from 12 to 22 feet, and it is necessary to have a deep canal to get coal through, because you can carry coal as cheap—you can carry 5,000 tons of coal as cheaply as you can carry two, and a 5,000-ton barge means deep draft, and the more freight you can carry the cheaper the freight will be, and when you cheapen the freight you cheapen the commodity.

The CHAIRMAN. How many tons of coal do they carry on a 22-foot barge?

Captain REYBOLT. From four to five thousand tons, and the tug-boat generally takes from two to three, and the speed of that tug is just about 3 miles, just canal speed.

Now, when it comes to the whole inland project, if you will just take a map and draw a line from Baltimore across to the Atlantic Ocean, you will see that that line strikes the Atlantic Ocean just a little south of Atlantic City, and Baltimore coal that is shipped to-day up that way is really not started on its way until it reaches that line; and if you ship from Baltimore up the Delaware and Chesapeake Canal, up the Delaware River and up the Delaware and Raritan Canal, you will find that the time and the distance and the expense and the risk that is thrown away on that coal lands it at Newport, R. I., at its destination, before it is now started, and the cheapening of freight on that one item is not all. You might take cotton, lumber, and all of raw material, and I hope—of course it has been a

hope for years—that before another year we will see the dirt flying along the Chesapeake and Delaware Canal.

The CHAIRMAN. Do I understand that these barges that carry four or five thousand tons of coal require a tug continuously to their destination up to Boston?

Captain REYBOLT. Yes, sir.

The CHAIRMAN. They do not go under their own power?

Captain REYBOLT. No, sir.

The CHAIRMAN. And most of the coal is carried that way?

Captain REYBOLT. Yes, sir; it is all carried that way now.

Mr. BURTON. You stated that you represented 10,000 people, but did not tell the committee who they were.

Captain REYBOLT. It is the American Masters and Pilots' Association that I represent here to-day—the men who navigate this coal along the Atlantic coast. We are scattered all over this country. We are advocating the improvement of the Mississippi River, and the improvement on the Pacific just as strongly.

Mr. HARDY. Most of us can not get over a 12-foot canal down where we live, and it appears that the railroads have shelved that 12-foot canal. Have you got any suggestions for the benefit of the 12-foot canal? They tell me it has dwindled away.

The CHAIRMAN. They killed it by owning or controlling it. Government free canal they can not possibly own or control.

Captain REYBOLT. There is only 10 feet of water through that canal—9 feet 4 inches. It is as much as you can carry through the canal, and the locks are only 24 feet wide, and you can only have a vessel 23 feet 6 inches to go through those locks.

Mr. HARDY. With that end of the canal, if the railroads are allowed to reduce their rates between water points and then raise them on all the intermediate points, can they not shrivel up any kind of commerce to death and stop your water navigation?

Captain REYBOLT. I do not see how they can do it, because when this canal is finished through New Jersey and this Erie canal is finished, that will certainly control railroad rates from all the lake cities to Baltimore and Philadelphia.

Mr. HARDY. Have they not killed the transportation on water in a number of cases by unfair competition?

Captain REYBOLT. They killed it the same as they did in the city of Philadelphia. The railroad company is acquiring the city front, so as not to let them have any place to land. I once wanted to run a line on a railroad dock and had to land a man there with a gun and threaten to shoot any man who interfered, because they would not let you run a line on the railroad docks.

Mr. HARDY. You said you could do these things without any Government regulations. Don't you need pretty stiff regulations to prevent unfair competitive methods between your water routes and your railroad routes?

Captain REYBOLT. I presume you do.

Mr. CHANEY. Of course, if this were a free canal, there would not be any chance for them to control the traffic through there.

Captain REYBOLT. No; what I mean is simply this: Here is the Pennsylvania Railroad between here and Philadelphia, double track, with all its equipment and everything. How much money would it take to build a competing road to that? Now, if you will give us this

canal free, a \$3,000 barge will compete with the Pennsylvania Railroad from Washington to Philadelphia.

Mr. HARDY. For that entire distance unquestionably it would, but if you will allow your railroads to reduce freight between Washington and Philadelphia, and then raise freight on all intermediate points, they could profitably drive your barge off the water.

Captain REYBOLT. I think you have got a law to prevent that. Right on this peninsula, you can go down there and ship oysters from seaport to Norfolk, and ship them back to Wilmington, and get them cheaper than you can to ship them direct, because when you get to Norfolk there is competition.

Mr. HARDY. And still you have got that law that you speak of.

Captain REYBOLT. Yes, sir.

Mr. BURTON. Now, Mr. Chairman, I would like to have a word from Mr. William D. Mullen.

STATEMENT OF MR. WILLIAM D. MULLEN.

Mr. MULLEN. Mr. Chairman and gentlemen, I would have you to understand that I am not representing in an official capacity the National Board of Trade, of which I am a member and a director. I am representing to-day the Wilmington Board of Trade. The Wilmington Board of Trade has been vitally interested in this canal project for a number of years and the project of connecting the waterways of the Chesapeake and Delaware bays, which has been before the people since 1812. This is not a new thing, and of course we are all aware that the interest in this project died out. In 1893 it was again renewed. In 1895, you are all familiar, of course, with the fact that Congress authorized the President to appoint a board to go over this very route that we are now talking about to-day, with a recommendation that it was the most available route then known for the selection of an open waterway between the Chesapeake and Delaware bays.

Now, in 1904, the Wilmington Board of Trade became interested in this project. You may ask us why we are interested. We are a large manufacturing city. We have very little water-borne commerce, and we feel the necessity of having a deeper rate of freight for our manufacturing industries. We are located, as you may know, upon the line of the two great trunk railways, who fix the rates, and, as you well know, those rates are not competitive rates, leaving us with no outlet to the south and in a large measure retarding the industries in Wilmington. In fact, we, as a manufacturing city, are seeking a very large outlet in the South for our manufacturing. Now, this thing came to us in that form, and a banquet was projected by the Wilmington Board of Trade to further the project of opening up this waterway. You gentlemen, I think, are likely familiar with that banquet. It was an interstate banquet, and this whole matter was very thoroughly discussed, and the attention of the country was called by that banquet to the necessity of the opening up of this waterway.

In the year 1904 it was my good fortune to represent the Wilmington Board of Trade at the national convention in Washington, and I had occasion to introduce a resolution into that body favoring the opening up of the Delaware and Chesapeake Canal and making it a free

ship canal. At that time the sentiment was considerably against it, for the reason, I think, that our neighboring cities, Baltimore and Philadelphia, had lapsed into a condition of not wanting it, or not really caring for this trade, and for the reason that it might possibly mean that Baltimore would lose her bay commerce and that Philadelphia might be affected. I took occasion at that time to sound the delegates at the national convention and to interest them in this waterway, and I found a large sentiment prevailing among all of the representatives of the eastern cities in favor of this waterway. More particularly, that gentlemen came very strong from Boston on account, as has been explained here, of the fact that they were not able to get their coal at an advantageous rate, and then Baltimore and Philadelphia a little later on became interested also. We in Wilmington have been very unselfish in this matter. We have felt as though the Delaware and Chesapeake Canal has been a very part of our little State. I myself came into existence on the banks of the canal and during the war it was my good pleasure to live there during that time, and I know something of the commerce of that canal during the war. At that time, I believe, the rates then existing were not the rates that exist to-day. The commerce of that canal, I believe, paid a dividend upon the bonds and, I believe, also a dividend upon the stock.

Now, since that time all that has disappeared. It has disappeared on account of the opposition, that has been explained to you, by the railway companies, and the canal has sunk almost into insignificance. We believe, gentlemen, in looking around over this broad field between the Chesapeake and Delaware bays and learn something about its commerce. In 1904, I think, the records of the Government show that fifty millions of freight were carried upon those two waterways. That was the registered tonnage. Now, those seem like very large figures. The unregistered tonnage, I do not know what it amounted to, but possibly 15,000,000 to 20,000,000 tons more. Now, that is with a 9½-foot channel in the Delaware and Chesapeake Canal. Now, gentlemen, with a 25 or 30 or a 35 foot channel, you can see the possibilities of this waterway to the commerce of this country. I have been an advocate of this for years, and there is no question in my mind that the commerce that now exists would receive such an impetus by the opening of this canal that we would be unable to measure it. We stand to-day—having advocated this project—we stand to-day committed to it. I believe in the general project of the improvement of the inland waterways. I helped to advocate it at the last session of our National Board for the reason that they felt it was against their policy. But this is the one great important link which we have already started, and that is the connecting link between these two bays. To my mind it is important to the general scheme of improvement of the waterways that this improvement should be made first and should be made now.

Now, Mr. Chairman, Mr. R. J. McClean, chairman of the Wilmington Board of Trade, will say something in regard to this question.

STATEMENT OF MR. R. J. McCLEAN, ESQ.

Mr. McCLEAN. Mr. Chairman and members of the committee, the time for discussion closed several years ago. Representing a body of 700 men I come before the members of this committee to say that we

have stopped talking about this project. We talked about it years ago. We have gone over it from every point of view and are thoroughly convinced that the only thing to do now is to go ahead and complete the project. It seems to me that the more that is said the cloudier the proposition becomes. All a man has got to do is to look at the map which is placed in your hands this afternoon. You will notice Chesapeake City at one end of that canal. If a ship desires to go around to the other end of that canal the ship has got to travel 400 miles, and yet the distance from one end of that canal to the other is less than 14 miles. The whole proposition in regard to this canal not having been built years ago is a reflection on the good sense of the American nation. When I arrived here to-day it required no argument to convince me that I needed my dinner. I was pretty well shook up coming down on the road, and I had some inside information which told me that I needed my dinner, and needed it very much, and I wish to tell you gentlemen this afternoon that I have some inside information from the men who live along the Atlantic seacoast, and that is unless this committee and Congress build this canal and make good and proper you will not meet with the approval of those people.

There was something said this afternoon in regard to the Pennsylvania Railroad, and I wish to say to you that the Wilmington Board of Trade has no fight with the Pennsylvania Railroad. We regard it as one of the finest institutions we have in this country. Let me read to you an extract from a speech delivered at our banquet in Wilmington in 1904 in support of the deepening of this canal:

It has been currently reported that the Pennsylvania, Baltimore and Ohio, and Reading railroads, traversing Delaware, would oppose the construction of this canal because of its competitive features. It seemed of the highest importance that their attitude should be at least ascertained and if possible their cooperation secured. Accordingly the liberty was taken of addressing a letter to each of those railroads, setting forth in detail the necessity for the canal to facilitate the national defense and commerce, and hoping that it would induce a local industrial development of much greater importance in the way of developments than any freight that might be lost through its competition. In reply President Cassatt invited the writer to meet him in Philadelphia. At the close of our conference Mr. Cassatt authorized me to announce to you here to-night that the Pennsylvania Railroad would not oppose this ship canal, but would favor it. We have the best of reasons for believing that the other two lines will also support the project, although final answers have not yet been received from them. A few evenings ago, at a public banquet in Baltimore, retiring President Loree, of the Baltimore and Ohio Railroad, advocated this canal, saying that it would make Baltimore a real ocean port, and avoid the dangerous trip around the dangerous Virginia capes, and save about 200 miles of the distance to New England ports.

You see, therefore, the stand of the railroads as far as this project is concerned. This particular project has one thing in connection with it that I desire to call your special attention to, and that is there is no human being, no institution, no corporation, no concern of any kind opposed to it. I do not suppose that any delegation could have come here from any part of this country and call your attention to any project that would not have some interest against it; but there is no manner of person in this country who can bring forward one reason why this canal should not be built. Everyone is in favor of it. No one is against it. The reason for that is that the project is not a local one. It is a national one. We have the highest interest of Washington at stake. We desire it to defend our national capital, and to do that we need the canal. The shipbuilding would be

increased, and of the hundreds of ships which are now on these bays their number would be doubled—quadrupled.

As I said in the beginning of my talk, I believe the time for discussion has closed. It is not my desire to discuss the main points of this project, but I will leave with you, Mr. Chairman, a copy of speeches delivered at our banquet in 1904. These speeches contain all the facts in connection with this case, and there is nothing left to be done, Mr. Chairman, but to go ahead now with the project.

I thank you very much for your attention.

Mr. BURTON. Mr. Chairman, I guess about all has been said that might be said, but I want to add that the speeches made at that banquet started me on my road to Congress. I will now introduce Mr. Smith, who is connected with the Hollingsworth Company.

STATEMENT OF SAMUEL K. SMITH, ESQ., OF WILMINGTON, DEL.

Mr. SMITH. Mr. Chairman, I might speak in a personal way, and it would certainly improve the shipbuilding interest in Wilmington. Aside from what it would do for commerce generally, we feel that it would benefit us in Wilmington very much, and I come here representing the Hollingsworth Company, together with my friend, Mr. Budd.

Mr. BURTON. We will now hear from Mr. W. T. Budd, of Wilmington.

STATEMENT OF W. T. BUDD, OF WILMINGTON, DEL.

Mr. BUDD. Mr. Chairman, I had a whole lot to say, but these gentlemen have taken all my thunder. There is no question about the advantage it would be to our country in the shipbuilding line, especially equipped as we are for coastwise traffic. They do not give us ship-subsidy bills, but this would be better for us, because it would no doubt open up a great deal of transportation between the coastwise cities in small craft, and in that way would bring a great deal of trade to us. I have the pleasure of representing the navigation committee of our Wilmington Board of Trade, and we are, as the various members told you, certainly in favor of this canal. I believe if it were put to a special election in Delaware that you would not be able to get enough opposed to this scheme to represent the minority body. One great advantage which it would bring to our section of the country, and incidentally to the country bordering on the Chesapeake, has not been touched on, and that is, in our section of the country living is very high. I am told by Government statisticians that Philadelphia and Wilmington are among the highest priced places in the country so far as produce, such as vegetables and green goods, are concerned, and, by the way, Baltimore is one of the very cheapest places. Small boats that now go to Baltimore frequently in the height of the season in a few hours would be able to run through that canal and find an outlet in cities like Wilmington, Chester, Camden, and Philadelphia, and that would make it very much better for the producers and farmers for the land bordering on the Chesapeake, and incidentally make it very much better for us in enabling us to get fresh vegetables at a more reasonable price.

We are all very much in favor of this canal and we hope that this committee will recommend it, and that this Congress will pass the bill.

Mr. BURTON. Mr. Chairman, it is pretty late, and I do not know that there is anything else to be said. On the part of the delegation from Delaware and from Baltimore I want to thank the committee for its patient hearing, and I think these gentlemen have certainly convinced you all. I was convinced beforehand.

The CHAIRMAN. I want to say on behalf of the committee that it has been a very interesting meeting. Of course some of us were on the committee when the resolution was reported to have this survey and commission; we had several meetings before that bill was passed, and we obtained a great deal of information in connection with it, but several of the members of the committee have come on since that time, and they no doubt have been greatly interested in the hearing.

Mr. BIRDSALL. There is one question that I would like to ask Professor Haupt. As I understand, this estimate of \$22,000,000 in your estimation is too low.

Mr. HAUPT. Yes, sir; at the present prices. Labor is a little cheap just now, but ordinary contract work, when I made this estimate about a year ago, was about 40 to 60 cents for first-class railroad work.

Mr. BIRDSALL. Have you gone over the matter sufficiently to make an approximate estimate?

Mr. HAUPT. I think it ought to be increased in a general way at least about 30 per cent.

The CHAIRMAN. Would you have any objection to furnishing the committee with a statement, taking these figures as to the material to be used, and showing a little statement for our use as to what a 20, 25, and 30 foot canal would cost?

Mr. HAUPT. I will try to do so, Mr. Chairman.

Mr. HARDY. You would want that to apply from Philadelphia to Baltimore?

The CHAIRMAN. Yes. This 35-foot project includes a large amount of operating in the approaches, which to me is one of the expensive items of this whole construction, and we have not anything very definite. I notice that the commission says in their report that should a preliminary 30-foot depth of channel be adopted the cost as above noted will be reduced to about \$18,000,000. That is on a 30 foot. That reduces the amount from 22 to 18, or about \$4,000,000 difference. Now, for 5 feet off, that might bring that down, according to that estimate, to about \$14,000,000. Now, you would say that was too low, and probably your estimate for a 20-foot canal would be as much as their estimate for a 30-foot canal.

Mr. HAUPT. You may remember that in 1883 and 1884 General Gridley reported on all these routes, including this one, and for the 27-foot project his estimate was seven and one-half millions. His estimate for the Sassafras was \$11,000,000.

Mr. BURTON. I would like to ask if it has not been your experience that Government engineers usually make a liberal allowance for all contingencies, and that their estimates are generally high enough?

Mr. HAUPT. Yes; they are generally.

Mr. McCLEAN. Even if this canal cost \$18,000,000 to build, that would not be the cost of more than two battle ships, and the canal would be worth at least five or six battle ships in case of war.

Mr. BURTON. Mr. Chairman, I want to say to the committee that I asked Major Flagler to come down here, and he could not come because of a meeting that he had arranged for over in Jersey, but says that any day the committee was going to meet and would notify him a little in advance he will come and answer any questions the committee wished answered.

COMMITTEE ON RAILWAYS AND CANALS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., Wednesday, May 20, 1908.

The committee met at 10.30 o'clock a. m.

Present: Representatives Davidson (chairman), Roberts, Burton, Chaney, Wheeler, and Rothermel.

The committee thereupon resumed the consideration of the bill (H. R. 20775) to provide for the acquisition and improvement of the Chesapeake and Delaware Canal.

STATEMENT OF MAJ. C. A. F. FLAGLER, CORPS OF ENGINEERS,
U. S. ARMY.

The CHAIRMAN. Major, perhaps I ought to admit that we have not given as thorough study to the report made by the commission of which you were a member as we ought to have done by this time, or as we hope to do. But we have had hearings before the committee on this Chesapeake and Delaware project; and general statements have been made as to the commerce and as to the condition of the country there across the peninsula, either on the route of the Chesapeake and Delaware Canal or some other routes. Then the question came up especially with reference to the depth of a canal which would answer for commercial purposes, and perhaps incidentally for the lighter-draft boats of the Navy—torpedo boats and cruisers or gunboats, and vessels of that kind; also in connection with the proposed inland waterway from Boston to Florida, which probably will be made up of different links of canal construction from 14 to 16 feet (not to exceed 16 feet) in depth. I had asked Professor Haupt, of Philadelphia, to make me some figures on what a canal of 15, 20, 25, and 30 feet depth would cost. Your commission made a report estimating on a 30-foot depth, cut down from your detailed estimate of 35 feet. Professor Haupt has submitted some blueprints and some estimates of the cubic yards to be removed for the various depths, based on a general price of 16 cents a cubic yard for removal.

I simply make this explanation of the situation as it stands. I think the committee would be glad to hear you on the engineering features and on your ideas as to the advisability of a canal less than 35 feet deep and what depth would meet conditions generally in that locality.

Mr. CHANEY. And if a 16-foot canal would meet the conditions, what would that cost?

The CHAIRMAN. Yes—something along that line. If you will, please, just take up the subject in your own way and give us your views on it.

Major FLAGLER. This is a rather large basis from which to start in on the discussion—

Mr. CHANEY. We are disposed to give you plenty of latitude.

Major FLAGLER. The 35-foot depth on which estimates were submitted was considered fixed by the provisions of the joint resolution under which the commission was formed. We submitted the alternative depth of 30 feet owing to the fact that the channels in the Delaware River at present are only 30 feet deep; and it seemed advisable to defer construction to a depth of 35 feet until there was 35 feet in the Delaware River. But we made our plans larger in cost and size than would be necessary initially to make a 30-foot canal in order that the surface widths and the revetments along the sides of the canal should be sufficient for a 35-foot canal when developed to that depth.

It would appear to me that in making a 16-foot depth canal, if such should be adopted, it would be advisable to maintain these same widths. The cost of construction of revetment is quite large; and in order to deepen the canal to 35 feet, if made the proper width for a 16-foot canal, would require considerable surface widening, and, necessarily, the tearing out of the revetment along one side of the canal throughout its length.

Mr. BURTON. What we understand by the revetment is the—

Major FLAGLER. The protection of the banks.

Mr. BURTON. Above the water?

Major FLAGLER. Yes. If the banks are not protected by such a revetment, it will be necessary for boats to go through very slowly to prevent the wash of the boats destroying the banks.

Mr. ROTHERMEL. That is a very important matter, is it not?

Major FLAGLER. It is. It would limit the advantages of the canal very seriously if boats had to be restricted to a very slow speed in passing through the canal.

Mr. CHANEY. So that it would be necessary to revet the canal the entire distance?

Major FLAGLER. Nearly the entire distance. In all places where the cut is in land, so that the land projects above the surface of the canal on both sides, it should be revetted. Some of the canal is through open lakes; and then, of course, the approaches on both sides, being in open water, require no revetment of any kind. The wash is broken by the surface water itself.

Mr. ROBERTS. Let me see if I understand you. The commission's plans contemplated a canal 30 feet in depth, with the revetments so constructed as to allow the deepening of 5 feet without changing those revetments?

Major FLAGLER. That was it exactly; yes, sir.

Mr. ROBERTS. And the only added expense would be taking out that 5 feet for the 150-foot width of the bottom?

Major FLAGLER. That would be all. That explains the rather large price for the 30-foot canal as compared with the 35-foot one.

Mr. BURTON. Then your idea was that if they should make a 20-foot canal, the proper thing to do would be to make it wide enough to allow deepening at any future time to 30 or 35 feet, if desired, without change of the revetments?

Major FLAGLER. That would be economical, if there is any immediate prospect of doing it. But the difference between a 35-foot canal and a 16-foot canal is so very much greater than the difference between a 35-foot and a 30-foot canal that unless there was an immediate prospect of enlargement to the 35-foot depth it might not be advisable, in constructing a 16-foot canal, to put these revetments in so as to permit enlargement for the whole distance to a depth of 35 feet.

The CHAIRMAN. Would it be possible to construct a revetment for a 20-foot canal so that it could be utilized without change for a 30' or 35 foot canal?

Major FLAGLER. It is simply a question of width.

The CHAIRMAN. That is, on the top?

Major FLAGLER. On the top; yes, sir.

The CHAIRMAN. How far below high-water stage in the canal is that revetment usually carried to overcome the wash?

Major FLAGLER. It is carried a few feet below water. The tide in the canal would run from 6 feet at one end to 2 feet at the other.

The CHAIRMAN. So that on the slope below the revetment for a shallow depth it would be a more level slope, and that could be deepened without disturbing the revetment afterwards?

Major FLAGLER. It could. There would be no change in the type of the revetment for any depth. It simply must go a certain distance below the water level to protect the banks from wash. Whatever the depth of the canal, the type of the revetment would be the same; and if the revetments were placed sufficiently far apart for a 35-foot canal, the canal could be deepened to that from any minor depth at any time with simply the cost of dredging.

Mr. WHEELER. You speak about the revetment. Is that the protection of the slope with stone?

Major FLAGLER. The protection of the slope; yes, sir. There is a cross section of it in the report that shows it just at a glance.

Mr. CHANEY. If you would go down the Mississippi River you would see this work done.

Mr. WHEELER. I have never been down the Mississippi.

Mr. CHANEY. Down there they construct them of willows and poles and wire, etc.

Major FLAGLER. That is on sheet 10, etc. That represents the low-water level and shows some piling, with sheet piling on the inside.

Mr. WHEELER. Then you carry it up perpendicularly? Is that it?

Major FLAGLER. That is just the piling and sheet piling at the bottom. Then it is faced with stone up that way [indicating] to take the wash of the waves. But this extends only about 4 feet below low water, so that any type of canal that might be adopted would have exactly the same type of revetment.

Mr. CHANEY. In your estimates for the 35-foot canal you provided for a stone revetment all the way through?

Major FLAGLER. All the way through the land cuts.

Mr. CHANEY. I mean to say, through the land cuts?

Major FLAGLER. Yes, sir.

Mr. CHANEY. On both sides?

Major FLAGLER. On both sides.

Mr. CHANEY. Down to how many feet below low water?

Major FLAGLER. About 4 feet.

Mr. CHANEY. That would make the entire space revetted, perpendicularly or on a slope how much?

Major FLAGLER. Perpendicularly it would be 16 feet.

Mr. CHANEY. Sixteen feet?

Major FLAGLER. But it is on a very flat slope, 1 on 2½, so that it would be about 36 feet in length.

Mr. CHANEY. The revetment would actually be 36 feet wide?

Major FLAGLER. Thirty-six feet wide.

Mr. CHANEY. I see.

Mr. WHEELER. Would you need it as wide as that (1 to 2½) if you faced it with stone?

Major FLAGLER. Yes, sir; that slope is figured from the nature of the soil, as what it would suitably stand at. To make the revetment support the slope would require a much more expensive type of revetment than we have provided there. That is merely a facing for protection.

Mr. CHANEY. Would a revetment such as they put in on the work down the Mississippi be of any service on this canal? They make it down there, you know, of willows and poles.

Major FLAGLER. I know they do. It would be perfectly satisfactory; but—

Mr. CHANEY. It would save the wash?

Major FLAGLER. It would save the wash; it would protect the banks; but it would be more expensive than this.

Mr. CHANEY. It would?

Major FLAGLER. Oh, yes, indeed. Those mattresses are rather expensive to build. They have to be constructed solidly.

Mr. CHANEY. I supposed they would not be anything like so expensive; so it shows you how much I know about it.

Major FLAGLER. I am sure they would be more expensive than this type, though not as expensive as a laid-up wall.

Mr. BURTON. And they would have to be more frequently renewed?

Major FLAGLER. Yes, sir.

The CHAIRMAN. How high up toward the top of the bank would this revetment have to be carried to prevent caving? Does that depend on the nature of the soil in different places?

Major FLAGLER. No; it would simply be carried up to 12 feet above the water where the bank ran that high. In some cases the cut would not be that deep. That would allow for the height of 6 feet of tide, and would then give 6 feet of revetment still exposed above the water for the wash of the waves from vessels, which run quite high, especially on these flat slopes.

Mr. CHANEY. Owing to the tide, would a 16-foot canal float a vessel drawing 20 feet of water through the canal?

Major FLAGLER. No. The tidal range at the Chesapeake end of the canal is only 2 feet; so that the maximum that we could count on for going through a 16-foot canal would be about 18 feet. A vessel can not run with less than 1 foot under her bottom; so that 17 feet would be about the extreme limit, by taking exact advantage of the tide at that end.

Mr. WHEELER. You have more tide on one side than on the other, then?

Major FLAGLER. Yes, sir.

Mr. CHANEY. And the rate of speed would have to be controlled anyhow, even when you have the revetment?

Mr. FLAGLER. It would have to be controlled. About 5 knots is what the commission figured on.

Mr. WHEELER. How many miles is that?

Major FLAGLER. Five and seventy-six one-hundredths.

Mr. BURTON. Practically 6 miles an hour?

Major FLAGLER. Nearly.

The CHAIRMAN. Of course, the inland-waterway proposition, as I said, is usually talked of as providing for either a 14-foot or a 16-foot depth. I think it is fair to assume, Major, that the amount of commerce in the Chesapeake which might make use of this canal to avoid the capes, and then take the ocean route to New York and Boston in preference to the inside route, would perhaps warrant us in making this particular link deeper than would be used by the boats following the intercoastal canal. As to that question, what would you say, of the commercial possibilities of a canal 25 feet in depth?

Major FLAGLER. I think a 25-foot canal, on that stretch of the inland waterway, would be more nearly justified than along any other part, as a special depth; because there would be more commerce going through this particular canal that would not follow the rest of the inland waterway, I think, than any other part, except possibly the Cape Cod link.

The CHAIRMAN. What is the draft of the boats operating in that vicinity generally on the Delaware and the Chesapeake?

Major FLAGLER. Nine feet.

The CHAIRMAN. I do not mean on the canal, but on Delaware Bay and Chesapeake Bay, and on the Atlantic coast?

Mr. ROBERTS. The vessels of the Metropolitan Line, the Merchants and Miners' Line, and all those?

Major FLAGLER. None of them draw over 25 feet, but some of the large tramp steamers coming in there will draw 28 and 29 feet.

Mr. BURTON. The Merchants and Miners' and the Clyde boats draw anywhere from 20 to 25 feet?

Major FLAGLER. Yes.

Mr. CHANEY. From your investigations already made, could you calculate, without additional investigation, the cost of a canal 16 feet in depth, so constructed as to admit of a depth of 25 feet without widening and disturbing the revetment?

Major FLAGLER. Yes; that could be done without additional field work.

Mr. CHANEY. That is, have you enough data to enable you to sit down at this table and figure it out?

Major FLAGLER. I have; but it would take quite a long time.

Mr. CHANEY. We will have to have it figured out by somebody.

Major FLAGLER. Yes.

Mr. BURTON. The cost of constructing a 25-foot canal would be much less, proportionately, than even the making of a 30-foot canal, would it not?

Major FLAGLER. Yes.

Mr. BURTON. Every 5 feet you add goes into the cost more rapidly?

Major FLAGLER. Yes.

Mr. CHANEY. What is the proportion of cost in increased depth?

Major FLAGLER. Within these depths it is merely a question of yardage. The construction would not cost more for the greater depth than for the lesser depth, except as to the number of yards concerned. But the maintenance increases quite rapidly with the increased depth—the cost of annual maintenance.

Mr. CHANEY. In what respect?

Major FLAGLER. The shoaling is more rapid in the greater depths.

Mr. BURTON. How is that accounted for? By the loose soil that you go through, or the filling in from washes?

Major FLAGLER. The cross-section is diminished; and if there is any flow to maintain in a channel of any kind, the amount of flow is less; and the less the velocity, the more rapid the deposits. Then, in the open stretches, it is a greater disturbance of natural conditions the deeper one goes. The large increase in the annual maintenance for the greater depths would occur in the open stretches; not in the canal itself, but in Elk River, Chesapeake Bay, and the Delaware.

Mr. BURTON. Your estimate of the cost is made from the Delaware end of the canal to the deep-water end in Elk River or Chesapeake Bay?

Major FLAGLER. In Chesapeake Bay; yes.

Mr. BURTON. Would you think it advisable, in that special link, to construct a canal less than 25 feet deep?

Major FLAGLER. I would.

Mr. BURTON. You think it advisable to construct one now less than 25 feet in depth?

Major FLAGLER. I think that 90 per cent of the commerce that would be interested would be sufficiently served by a 16-foot tide-water canal.

The CHAIRMAN. As an independent proposition, without reference to your report as a member of that commission, is that your judgment of the best thing to do at present—to construct a 16-foot canal?

Major FLAGLER. That would be mine; yes, sir. As to whether it should be constructed of a width to permit future development to 30 or 35 feet, I would want to see some figures first. There is one method that might be followed as a compromise between the two, of putting in a permanent revetment on one bank of the 16-foot canal and then putting in a cheap temporary wooden revetment, such as is now on the canal, on the other bank, that could be dredged out along with the other material when the canal was widened. I think that probably the figures would show that to be the best method from a commercial standpoint, to get the results quickly and cheaply.

Mr. WHEELER. That looks all right.

Mr. BURTON. That seems like a good idea. Then, if it was ever widened, it would be widened altogether on one side?

Major FLAGLER. On one side; and the only loss of the original construction would be the loss of the light revetment that was put there.

The CHAIRMAN. There would not be anything wasted in the enlargement?

Major FLAGLER. Nothing wasted.

Mr. BURTON. That would last for a good many years, and if it was destroyed it would not be such an expensive thing to throw away?

Major FLAGLER. No.

The CHAIRMAN. Are there any further questions along that line? If not, Major, on the question of the value of the existing property of the Chesapeake and Delaware Canal Company, on what basis did you estimate your figures? I understood from Professor Haupt here the other day that the canal company would hardly accept the compensation recommended by the commission for their property and franchises, etc.; and he has submitted some data here which I have not had time to go over carefully, but which I think to some extent differs from the conclusions which your commission arrived at.

Major FLAGLER. We have on page 18 of the commission's report a parallel statement of the value as submitted to us by the canal company itself and our revised estimate.

Mr. CHANEY. There is a parallel column there showing the valuation by the canal company and the valuation by the commission.

Major FLAGLER. The first figure, the dry excavation, we accepted at their own statement of amount, 15,000,000 cubic yards; but we figured the value of it, under modern methods, at 16 cents, whereas they had quoted it at 25. This was a valuation, as stated, on the cost of reproduction of the canal as it at present stands with modern methods. That was one method that we took of determining the value of the property—that is, what it would cost for a contractor to go into the field now and excavate that canal on the ground as it was before the canal was constructed. So that brought us down on the price.

The dredging, the second item, we reduced in the same way to modern prices.

Mr. BURTON. They had that at 16 cents, and you cut it down to what it could be done for now?

Major FLAGLER. We cut it down to 13.

The CHAIRMAN. Is the Government doing any dredging in that vicinity for 13 cents by contract?

Major FLAGLER. Yes. I let a contract yesterday for 9.4 cents in the Murderkill River; and 13, I think, is fair.

The CHAIRMAN. You think that is a fair estimate?

Major FLAGLER. Yes, sir. Even in the Delaware River, where the dredging is quite difficult (a 30-foot depth in open water); the material has to be dredged, towed, and rehandled ashore; and yet the prevailing price now, I think, is about 14½ cents, and it was 13.9 cents when I first came to this district.

Mr. BURTON. What was it when you first came?

Major FLAGLER. 13.9 cents.

Mr. BURTON. Now it is about 14?

Major FLAGLER. About 14.5, I think. It varies in different sections.

Mr. BURTON. That is handled twice?

Major FLAGLER. That is handled twice; all of it.

Mr. BURTON. The chances are that this estimate submitted by the company was made by Professor Haupt, who is one of the directors in the canal.

Major FLAGLER. In the other features that we have there it will be seen that we have taken the canal company's statement exactly in two cases. In all the others, where the authority is marked in the third column "Thompson," those figures were obtained by a careful investigation by a civil engineer named Thompson, who was employed

for that purpose, and his reports are given in detail in the appendices to the report of the commission. They furnished us with detailed drawings of the locks, so that he was able to make his computations in regard to the value of the locks quite accurately; and where he was unable to get it from inspection, or from plans furnished by the canal company itself, he accepted the canal company's statements. That produces that reduction from five million three hundred and odd thousand dollars to three million seven hundred and odd thousand.

Mr. CHANEY. Yes; it makes quite a difference.

The CHAIRMAN. Professor Haupt, in a communication that he has submitted to me, says, in speaking first of the jetties (differing with you somewhat in reference to the jetties):

The other is the heavy revetments, estimated at \$1,107,000 for a length of 130,000 feet; whereas the company's estimate for 80,000 feet was reduced to 70,000 at \$1 per linear foot, because the canal is only a little more than 71,000 feet long.

I think what he means by that is that in your report you have given the revetment as 103,100 linear feet, at \$6.50 per linear foot. No; I do not know whether that is it or not.

Major FLAGLER. That is it.

Mr. CHANEY. What page?

The CHAIRMAN. That is on page 8—\$670,150; while in his estimate he has only allowed for 80,000 linear feet of bank revetment, at \$1 per foot. In your estimate of the cost of a 35-foot canal, where do you figure out 103,100 linear feet?

Major FLAGLER. A great deal of the present canal is in open water on one bank, due to its summit level. When we make a tide-level canal quite a large portion of it will be so lowered that there will be land banks on both sides, which increases quite considerably the amount of revetment that we have. The present summit level is about 16 feet—17.28, I believe, to be exact. The difference in price is, of course, due to the difference in the type of revetment.

The CHAIRMAN. Yes.

Major FLAGLER. The cutting down from 80,000 to 70,000 feet is covered by Mr. Thompson's report, in the first paragraph on page 24.

Mr. CHANEY. It makes it 70,000, does it?

Major FLAGLER. Seventy thousand; yes, sir.

The CHAIRMAN (reads):

The canal being only 71,788 feet in length, 70,000 feet would be fair for the length of revetment.

Mr. WHEELER. What page is that?

The CHAIRMAN. That is on page 24. That comparison is based upon 70,000 instead of 80,000 feet?

Major FLAGLER. Seventy thousand instead of 80,000; yes, sir. That makes a difference of only \$10,000 there.

Mr. WHEELER. If the Government should buy that canal, would the revetment that they have in there be in such condition that they could use it? They could not use enough of it, could they?

Major FLAGLER. It would be absolutely useless, I think.

Mr. WHEELER. It looks so to me.

The CHAIRMAN. What is the depth of the canal now?

Major FLAGLER. The depth on the sills of the canal locks is supposed to be 10 feet; and they maintain by dredging a little greater depth than that to allow for constant shoaling in the stretches between, on the levels.

The CHAIRMAN. If that property is acquired, and we go to work on a basis of 16 feet, of course the locks would have to be entirely rebuilt. Would the existing canal have to be widened in order to get a depth of 16 feet?

Major FLAGLER. It would have to be widened; yes, sir. But all the plans contemplated by the commission were for a tide-level canal and the locks would be entirely removed.

The CHAIRMAN. Oh, yes; that is right; a tide-level canal. That would not need any lock at either end—not even a tidal lock.

Major FLAGLER. None at all; no, sir.

Mr. CHANEY. If the Government should purchase this property, and the revetments could not be made use of at all, ought the Government to figure out what the revetments in place are worth; or, rather, should we not find out how much stone there is, and what the value of the stone is?

Major FLAGLER. No estimate was ever reported of what the value to the Government of the present canal would be. It is not figured on that basis. It was merely referred to in the report as being relatively small. An estimate was made of it at one time, and, if I remember correctly, it amounted to about \$1,600,000.

Mr. CHANEY. These figures here do not mean the actual value of the canal to the Government?

Major FLAGLER. Not at all. They simply show the value of the canal to the canal company that the Government should pay. That was the basis on which we made the appraisement.

Mr. BURTON. You are buying something which you are going to destroy; that is all. You are paying them for it because they own it.

Mr. CHANEY. It is like buying an old house on a lot; it is worth about as much with the house off of it.

Major FLAGLER. We made a statement at the bottom of the second paragraph on page 20 in reference to that, saying:

The value of the works of the present canal as a part of a ship canal is relatively very small, and has not been estimated.

Mr. CHANEY. I see. I would not need to have asked you all the questions I have but for the fact that I was not very familiar with your report.

The CHAIRMAN. That is the trouble with all of us. We have not devoted as much time to your report as we should have done.

Mr. CHANEY. I want you to understand that we are not engineers.

Mr. ROTHERMEL. The report seems very complete to me.

Major FLAGLER. We have made it as complete as we could with the fieldwork available. A very accurate survey would have enabled us to do a good deal more.

The CHAIRMAN. You used the old surveys, the fieldwork of the old surveys, largely, did you not?

Major FLAGLER. The only fieldwork that we did was in running the profile lines on both canals, and making quite a large number of additional borings, which were very expensive.

Mr. BURTON. What the committee seems to want to know about is the approximate cost of a canal of a lesser depth, and the matter of taking over the present canal and buying it. The bill provides that the

purchase price shall not exceed \$2,515,000, and I think your figures are \$2,514,000 and a fraction. Professor Haupt thought that that was entirely too small a figure, as of course he would. I suggested to him the advisability of not destroying the property that belonged to these men at all, and taking another route. He did not think that would be a good thing to do, because it would injure their business.

The CHAIRMAN. What is your idea of that Major—that is, of another route? Could we construct a canal over any other route which would be as good commercially, and from a military point of view, for less expense than to acquire this property for a fair valuation and construct a deeper canal here?

Major FLAGLER. No; we could not. The Sassafrass route, which we examined, comes fairly close to the cost by this Chesapeake and Delaware route, but exceeds it.

Mr. CHANEY. Does it exceed it by \$2,514,000?

Mr. BURTON. That is taken in.

Major FLAGLER. That is included in the cost of the Chesapeake and Delaware Canal, and it exceeds it, besides that by about a million dollars. Besides that, it is below the fortifications, which brings in another item, if the canal is to be defended, of about \$2,000,000, for moving the fortifications on the Delaware below the mouth of the canal.

Mr. BURTON. I only said that to see whether the canal company really did want to keep their property; and I very soon saw that Mr. Haupt did not want to consider that question at all.

The CHAIRMAN. Of course their property would be of no value if a free ship canal was constructed over any other portion.

Mr. BURTON. But is it not a fact that most of the commission, upon a superficial examination, really thought the Sassafras route would be cheaper; but when they thoroughly investigated it they found that the other was the better one? I think General Agnus gave me to understand so.

Major FLAGLER. That is absolutely correct. We were all convinced from the first cursory examination that the Sassafras route would be the better and prove the cheaper. But after it was surveyed the heavy cutting along the backbone of the peninsula was so much greater there than here that it changed our opinion entirely.

Mr. BURTON. It would be cheaper for the Government to buy this canal at the price estimated and construct a tide-level canal there than it would have been to have gone through the Sassafras route?

Major FLAGLER. Yes; of course it would be perfectly practicable for the Government to leave Back Creek at the present Chesapeake end of this canal and parallel it, say, a quarter or a half mile to the south. The Government could do that very much cheaper than it could build the canal by buying that of the Chesapeake and Delaware Company.

Mr. WHEELER. That is, right along near it?

Major FLAGLER. Right along near it.

Mr. WHEELER. Then it looks to me as if we are in a good position. If they are not willing to be reasonable about their property, we can put a canal right alongside of them if we think it is best.

Mr. BURTON. What did I understand you to say about leaving Back Creek?

Major FLAGLER. Leave Back Creek just below the mouth of the present canal, and then parallel this canal with a new artificial canal right across the peninsula, say, a quarter to a half mile south of it. The profile would be much the same.

The CHAIRMAN. The country is practically the same?

Major FLAGLER. Practically the same.

Mr. WHEELER. There is nothing particularly in the way at all?

Major FLAGLER. Nothing at all; it would only be necessary to purchase a new strip of land and cut right through it.

Mr. WHEELER. So if they are not willing to be fair and reasonable, it looks to me as if our position is good in that respect.

The CHAIRMAN. You say your estimate of this canal property was based on what it was worth to the canal company, and not on what it was worth to the Government?

Major FLAGLER. Exactly; Yes, sir.

The CHAIRMAN. Are there not some figures, or ought we not to have some figures, so as to know what this canal property is worth to the Government?

Mr. CHANEY. That is exactly my notion. I think we ought to have that.

The CHAIRMAN. You say you could build a canal right through the land, half a mile distant from this canal, at practically the same cost—is that it—allowing \$2,000,000 for this canal project?

Major FLAGLER. We could build it for much less. As I say, a rough estimate made at one time seemed to show that it would be worth about \$1,600,000 to the United States to utilize the present canal route. But it would be almost impossible, without a very detailed survey, to tell what the value would be, because we can not take the figures of the canal company of 15,000,000 yards excavation as being that much excavation saved in the price of a new canal. That is owing to the fact that a very large proportion of that earth—how much we could not determine without, as I say, a detailed survey—was not removed from the limits of the excavation of the new canal, but was simply placed along the bank (this being a narrow canal), and would have to be dug out again, just exactly the same as though it had been left in its original position.

Mr. CHANEY. That was what I was trying to get at.

Major FLAGLER. That is the trouble. All of their banks, their present footpath through all the lowland which has been thrown up there, would have to be dug out. We go to a lower level when we come to a tide-level canal; and leaving that as highland, that which was dumped along the whole strip there would have to be dug up again, and would cost just as much and a little bit more, because we would have to remove this revetment.

The CHAIRMAN. So that, as a matter of fact, the excavation which they have now is not of any material advantage to the Government?

Major FLAGLER. Not nearly as much as would be indicated by the amount of excavation that they state. Possibly half of it might be of advantage to the Government.

Mr. CHANEY. I think, Mr. Chairman, that we ought to have, if possible, the value of this canal to the Government if we were to take it over and make use of it in the construction of a ship canal; and I also think we ought to have the figures as to the cost of a 16-foot canal on

two bases—one just making it a 16-foot canal all the way through, as to width and everything, with revetments placed to suit a 16-foot canal, and another with revetments so placed and the canal made just wide enough so that we could go, without disturbing the revetments, to any greater depth we liked. Then, also, there might possibly be a third consideration—to take into account the actual width of the 16-foot canal, with the revetment on one side being substantial and permanent and on the other side a temporary wooden one. I think we ought to have those figures before we come to a conclusion about this thing.

Mr. WHEELER. It looks to me as though that is advisable.

Mr. CHANEY. And I take it that you would be able to give us that in the course of the summer?

Major FLAGLER. Very easily. That would require considerable field work; but if a survey was ordered to determine this point, it would be very simple to have it ready for the next session of Congress.

Mr. CHANEY. We could tolerate, in an investigation of this kind, something that would approximate the actual thing itself. I do not think, in view of what you have already done in survey work, that we would want to go to the trouble or put you to the necessity of making extensive field work; but you ought to supplement it by such field work as would satisfy you that you were giving us a reasonable approximation of what it is worth—of what it would cost.

Major FLAGLER. Yes, sir.

Mr. CHANEY. That is my individual feeling about it, Mr. Chairman.

The CHAIRMAN. I think that is absolutely right, but the trouble would be to get a survey ordered. I was trying to think out some plan by which we could ask this commission for additional information, for an additional report, through the Secretary of War—whether we could not get the Secretary of War to direct this commission to furnish this information. The trouble is, of course, that the resolution that we passed before was put through by the committee practically as it was introduced, and the whole idea was when they started—the war spirit—a battle-ship canal.

Mr. CHANEY. What is the wording of that resolution?

The CHAIRMAN. "That the President of the United States is hereby authorized to appoint a commission * * * to examine and appraise the value of the works and franchises of the Chesapeake and Delaware Canal, connecting the waters of the Chesapeake and Delaware bays, with reference to the desirability of purchasing said canal by the United States, and the construction over the route of the said canal of a free and open waterway having a depth and capacity sufficient to accommodate the largest vessel afloat at mean low water. Said commission, to the extent that the same can be done from the surveys heretofore made under the direction of the War Department and within the limits of the appropriation herein made, shall also examine and investigate the feasibility, for the purpose of such a waterway, of the route known as the Sassafra route. The said commission shall make a report of its work, together with its conclusions, upon the probable cost and commercial advantages and military and naval uses of each of said routes, to the Secretary of War, who shall transmit the same to Congress at its next session. The sum of \$10,000" was appropriated.

Mr. CHANEY. Has that \$10,000 all been exhausted?

Mr. WHEELER. What is the date of that resolution?

The CHAIRMAN. That was passed in 1906.

Major FLAGLER. It was all exhausted except \$671, which was turned in about three months ago.

Mr. CHANEY. And that has been covered into the Treasury, or just returned to the General Treasury?

Major FLAGLER. Covered into the Treasury—the surplus fund of the Treasury.

Mr. CHANEY. So it would have to be appropriated out again.

Mr. BURTON. Yes; there is no money available to pay the cost of making such an estimate as you mention.

Mr. CHANEY. It would seem to be within the limits of possibility to have simply an amended report based upon these questions. You men are all paid salaries, and I do not suppose it makes any difference to you what you work at, just so that you collect your money?

Major FLAGLER. Not at all; no, sir.

The CHAIRMAN. Of course, not all of the members of the Commission are on the Government pay roll. Mr. Agnus is not.

Major FLAGLER. No. Mr. Chambers, I think, is on the Pacific coast. He was the last I heard of him.

The CHAIRMAN. I think the work would probably fall on the Major.

Mr. CHANEY. I expect that is so.

Major FLAGLER. I think it would be very much better, because it is simply a matter of estimate. It is not a question where there would be any diversity of opinion.

Mr. CHANEY. Could you do it by the direction of the Secretary of War, without any further legislation?

Major FLAGLER. Undoubtedly, if the appropriation for examination and surveys will stand the expense. It would require an allotment from that.

The CHAIRMAN. We should have to take that matter up with the Secretary of War and General Mackenzie.

Mr. BURTON. It would require an allotment from the appropriation for surveys provided for?

Major FLAGLER. The general appropriation for examinations and surveys—if that would stand an allotment for this, there would be no reason why it should not be ordered.

Mr. CHANEY. I think it would be wise, Mr. Chairman, to ask the Secretary to do it, if he has a chance to do it, because I think we will have to have these figures.

Mr. WHEELER. It looks so to me. What would be the probable expense of such a survey and estimate as we would want there?

Major FLAGLER. It could not be done, I think, for less than about \$3,000. There would be no use in doing anything without a fairly comprehensive contoured land survey along the route.

Mr. WHEELER. Oh, that is true. We want it done right.

Major FLAGLER. And the Chesapeake and Delaware Canal Company, while they have a number of very good maps showing in plan their canal, have never done any contoured work of any value whatever.

Mr. BURTON. Do you think it could be done for \$3,000?

Major FLAGLER. I should say, at a guess, that it could be.

Mr. BURTON. That is less than I supposed it would cost. I suppose it would not take a great deal out of the fund allotted for surveys and examinations.

Mr. WHEELER. No; and we certainly want those facts. We do not want to do any foolish thing here.

The CHAIRMAN. I think it is important that we get them.

Major FLAGLER. If a canal is ever to be constructed this money would not be in any degree wasted, because this survey would absolutely have to be made before construction began.

Mr. BURTON. Would what you are referring to now include just the Delaware and Chesapeake Canal, or leaving Back Creek below Chesapeake City and going across the other way?

Major FLAGLER. It would just be the high ground in the Chesapeake and Delaware Canal. Sufficient information could be obtained without survey, from what we have now, to answer your questions on the other parts.

The CHAIRMAN. How much would it cost to carry out your suggestion of a canal paralleling theirs, but distant from it half a mile or so, as an independent proposition? If we knew that, it seems to me that we would be in a splendid position to make terms with the company.

Mr. CHANEY. We would be able to trade, then, all right.

Mr. WHEELER. He tells us the conditions are not very different.

Major FLAGLER. That could be very easily computed with very little fieldwork. Simply running a single line of levels along such a line would give all the information in the field that is necessary to give an estimate that would be within 5 per cent, anyway.

The CHAIRMAN. It would show practically the amount to be excavated?

Major FLAGLER. Yes.

Mr. BURTON. And would give the price of a sufficient width of land?

Major FLAGLER. Yes. We figured on a thousand-foot strip here, deducting the amount of holding that is now in the hands of the canal company. The same could be figured there, taking the whole 1,000 foot strip, just as we did for the Sassafras route.

Mr. BURTON. At what price per acre did you estimate land down there, do you remember?

Major FLAGLER. Two hundred and fifty dollars-for high land and \$100 for marsh land.

Mr. BURTON. Was not that a very high price to put upon it?

Major FLAGLER. Not from my experience with condemnation commissions in that vicinity. I have bought a good deal of land along there.

Mr. WHEELER. It is a good deal more than you could go and buy it for for farm purposes.

Major FLAGLER. Yes; that lower land there for farm purposes is valued at about \$100. It is assessed at about \$50; and the last lot of it that I bought we paid \$282 for.

The CHAIRMAN. You do not use it for truck farming, do you?

Major FLAGLER. No; that was for fortification purposes.

Mr. CHANEY. Would it be necessary to authorize you by resolution, or could you do it simply as the chairman of the committee without any resolution?

The CHAIRMAN. I think it would be proper to have the committee authorize me or Mr. Burton. This would make it more effective, perhaps.

Mr. WHEELER. We want to get these facts, and ought to have them.

Mr. BURTON. If I were to make a request of that kind, I should like to have it be a request of the committee, and not from me as an individual.

The CHAIRMAN. Oh, yes. I meant either for Mr. Burton or the chairman of the committee, just as the committee might prefer, to take the matter up with the Secretary of War and see what could be done.

Mr. BURTON. Mr. Chairman, I would like to ask the Major a question, if I can get it in proper shape.

The CHAIRMAN. Certainly.

Mr. BURTON. What is your judgment of the comparative advisability (taking it for granted that as a matter of course we could get no appropriation and no act of Congress on any bill we might report at this session) of getting that information, and proper estimates, with the survey spoken of by the chairman, before any report is made by this committee; or of making some kind of a report now? Which would be the better, to wait until that information is gotten, for the good of the work, for the probability of pushing it forward, or to go into it without having such information?

Major FLAGLER. I think it would be impossible to give any information that would be of value to the committee on the questions that have been asked without undertaking this fieldwork first.

Mr. BURTON. Then, according to your judgment, it would be better that we should defer a report on this bill until the next session, and in the meantime get that information, than to undertake to do it on the information we now have?

Major FLAGLER. That, I am afraid, is a little out of my province; there are so many questions involved.

The CHAIRMAN. If the information is to be of value, if it is worth having, it certainly seems to me that we ought to have it, Mr. Burton, before we commit ourselves to the project.

The following communications were received in response to a request from the chairman to Prof. Louis M. Haupt. They relate to the probable cost of construction of a canal of less depth than 35 feet:

PHILADELPHIA, May 9, 1908.

HON. J. H. DAVIDSON, M. C.,

Chairman Railroad and Canal Committee.

DEAR SIR: In compliance with your request to prepare estimates for various depths for the proposed Chesapeake and Delaware Canal, it gives me pleasure to submit some preliminary computations which may serve your purpose until I can secure the data as to the approaches, which I hope to receive from official surveys in a few days.

As a basis for the dimensions, I have taken the cross sections given in the report of the last commission (S. Doc. No. 215, p. 3).

This calculation is made for a uniform width of 150 feet at bottom, having side slopes of $2\frac{1}{2}$ to 1 below the bermes, which are 12 feet above water surface, and above that elevation the side slopes are $1\frac{1}{2}$ to 1, as shown upon the sketch herewith.

The cubes of excavation for the various depths, at 5 feet intervals, have been carefully worked out from the original surface profile, regardless of the existing canal prism, and they have been checked by comparison with other estimates made during the past twenty-five years, with which they accord fairly well, yet it is noticeable that the

aggregate for the 35-foot canal is less than the total as given in the commission's report (p. 8), so that it appears to me that in the making up of their estimate the clerk must have omitted to credit this route with the work already done and which the canal company estimated in its inventory at 16,435,700 cubic yards (p. 18). If this be the case, it would reduce the estimated cost of the canal by some \$3,979,721, or more than the commission's estimate for the entire "works."

If this credit for work already begun has not been overlooked, then to secure the total original volume it must be added to the total as given in the report, and it brings it up to 73,512,700 cubic yards, which is far in excess of the possibilities as given from my available data.

Of course if this route were not to be followed it should be omitted, but the plan as traced on sheet 1 (p. 74) follows the present location very closely, excepting for a short distance at the eastern end, which would not materially affect the quantity of excavation.

You asked me to figure on a canal of 15 feet depth and 150 feet width which contains, in round numbers, 34,000,000 cubic yards, of which 16,500,000 are already removed, leaving but 17,500,000 to excavate, and because of the existence of the continuous waterway it might all be taken out at hydraulic dredging prices, or, say, at 16 cents per yard, so that the cost would only be \$2,800,000 for this part of the work of creating a tide-level canal, and with this ample bottom width it could readily be deepened by dredging, continuing the same side slopes as shown on the sketch, to the 30-foot depth with a bottom width of some 76 feet. This enlargement would require the removal of some 4,500,000 yards, which at 16 cents, would cost only \$720,000 more. This would seem to me to be the most rational and economical mode of procedure and it would remove the greatest obstacle to legislation, by reducing the size of the appropriation. The great advantage of water carriage in the removal of the spoils, which is inherent to this route alone, will become more apparent when it is considered that the unit price may be reduced by at least 10 cents per yard as compared with the cost of dry removal, and if this economy be applied to the proposed 35-foot project after deducting the portion already excavated there will remain (50,670,500—16,500,000) 34,170,500 yards, which, at 10 cents, would represent a saving of \$3,417,050, an asset well worthy of consideration, which appears to have escaped the attention of the commission.

Thus by crediting this route with the excavation already completed and the facility for hydraulic prices afforded, the estimate may be reduced some \$7,400,000.

If in addition thereto the unit price for the real estate lying beyond the canal property and which has been appraised at \$250 per acre for the high land and at \$100 for the marsh land, be reduced to the basis of the canal company's estimate of \$50 it would effect a further saving of \$217,350, or if, on the other hand, the value of the company's lands be appraised at the same unit as that adopted for the more remote property, it would increase the value of the works and franchises by \$1,065,200 for these 8,000 acres of undisputed title in fee.

In the previous estimate of Captain Turtle in 1883 for the 27-foot canal, 100 feet wide at bottom, the land damages were appraised at \$50,000 and the total cost of that project at \$7,605,471.39, of which

\$3,328,325 was for excavation within the canal proper, embracing a little more than 22,000,000 cubic yards.

In this estimate the excavation above high water for a channel 100 feet wide at bottom and 27 feet deep was only 6,951,344 cubic yards, showing that the work already done on the present canal had been deducted.

The widening of the base of the prism from 100 to 150 feet increases the amount of excavation in this case about 33 per cent.

The total volume would therefore aggregate only 29,364,000 cubic yards for a channel 150 by 27 feet as based on the Government estimate of 1883, in which allowance had been made for material already removed as a necessary item to be credited to the "cost of reproduction."

This omission is the more remarkable, inasmuch as the commission states on page 3 that it was unable to secure from the company any inventory "but the most insufficient and almost totally useless figures;" yet it has taken the full inventory as submitted, and accepted the estimate of material excavated as to quantity, but greatly reduced the unit price for dry excavation, as well as for lands and other items, and finally made a "horizontal reduction" of about 30 per cent, because of the large sum required to construct a canal of the dimensions required by the act.

As soon as the estimates for the approaches are completed it will give me great pleasure to forward them with the hope that it may not be impossible for you to report a reasonable and practicable project, which will meet the present demands of modern commerce as well as pass our naval vessels adapted to the defense of the coast.

I have the honor to remain,
Very respectfully, yours,

LEWIS M. HAUPT.

PHILADELPHIA, *May 15, 1908.*

HON. J. H. DAVIDSON, M. C.,
Chairman Railroad and Canal Committee,
Washington, D. C.

DEAR SIR: Having completed my approximate calculations on the several depths as suggested for the Chesapeake and Delaware Canal, I am sending you the tabulated results for the approaches as a supplement to the totals for the canal proper already submitted. To determine if the commission had not overlooked crediting the present excavation and ascertaining the basis of its computations I have written for the information which it has denied me; but the closing sentence on page 20, second paragraph, probably answers the query definitely, where it is stated: "The value of the works of the present canal as a part of a ship canal is relatively very small and has not been estimated." Thus the magnitude of the 35-foot project appears to have eliminated the evaluation of the works of the present canal, which it was supposed the commission was to determine as an available part of, and important factor in the "cost of reproduction."

As stated in my previous exhibit, the unit price is an important factor, especially where the quantities are so large, and yet the highest price fixed by the commission is 16 cents even for dry excavation. While this is ordinarily much too low for average work, yet because

of the possibility of utilizing the present waterway for operating dredges I am basing these estimates on that figure as an average, since in the shallower approaches the cost is greater because of loss of time in shifting plant, and in the "deep cut" the pumpage is from 1 to 2 miles, and it may be necessary to handle the spoils several times over.

With a single unit the comparison is greatly simplified, but there are several other factors of almost vital importance to which I deem it proper to call attention en passant, and the first is the Delaware entrance, which has been shifted in the commission's project so as to lie about a mile south of Reedy Point, making it necessary to dredge two curving channels each about $1\frac{1}{2}$ miles long across a bulkhead of sand on which the low-water depth is only 1 foot, and this natural area of deposit is not reached by the 1,000 feet jetties proposed to protect the entrance. These jetties should be over a mile in length for each, if this location is desired. If shifted to Reedy Point it would be well protected by a half mile of work in all, with very little aid from dredging, and would add nothing to the length of the canal.

The other is the heavy revetments, estimated at \$1,170,000 for a length of 130,000 feet, whereas the company's estimate for 80,000 feet was reduced to 70,000 at \$1 per linear foot, because the canal is only a little more than 71,000 feet long.

Furthermore, had a credit been given the Chesapeake and Delaware Canal for its excavations it would have more than balanced the appraised "value of the works and franchises." Thus the Sassafras route is more fortunate in having done no work to be appraised, and no item appears for its lands in fee, which in the former case amount to 8,000 acres.

Returning now to the estimate for excavation and crediting all of the projects with the prism already removed, or 16,500,000 cubic yards, there will result the following table:

15-foot project, say 18,300,000, at 16 cents.....	\$2, 928, 000
20-foot project, say 23,100,000, at 16 cents.....	3, 696, 000
25-foot project, say 30,100,000, at 16 cents.....	4, 906, 000
30-foot project, say 44,300,000, at 16 cents.....	7, 088, 000
35-foot project, say 61,600,000, at 16 cents.....	9, 856, 000

It is worthy of note that although the unit prices are all at 16 cents and less in the commission's estimate, yet because of the omission of the work already done both in the canal and rivers, as well as the change of location, that its total for this portion of the work alone aggregates \$13,322,540, which is nearly \$3,500,000 more than is required in view of the present physical conditions.

But a practicable canal of even 30 feet depth and less width could be built which would meet existing demands for some years, and it could then be enlarged, if the conditions of the approaches warranted it. To-day the "30-foot channel" has a limiting draft of but little more than 23 feet in Delaware Bay, so that even with a 6-foot tide a 30-foot canal would not be accessible.

The fixed items which would be common to all the projects, but varying somewhat with depths, are bridges, say, \$1,000,000; revetments, \$500,000; dredge and jetty, \$300,000; total, \$1,800,000, which, added to the above estimate for excavation and adding 10 per cent, gives \$12,760,000. As a check applying the fixed charges

to the 25-foot excavation and adding 10 per cent for contingencies, there will result \$7,480,000, as compared with \$7,605,471 for the 27-foot project, as estimated by Captain Tuttle, for a canal 100 feet wide, so that the above figures would seem to be liberal. ■

The blueprint tabular statement will give the details of the cube of excavation in the approaches as well as the totals, and the print of the profile will be forwarded as soon as completed, showing the basis for these figures.

I have given my personal attention to this work that I might be reasonably sure that figures are correct and that it may serve you a good purpose as a reliable basis for formulating a safe and practicable bill to open the Atlantic coast to inland navigation and stimulate manufactures by reducing the cost of raw products for this dense population. If you can pass your bill I will feel that the labor has not been in vain, but I am well aware of the obstacles which encompass legislation. There are many changes which in my opinion should be made in the reported project, but it is not in order to offer opinions at this date further than to show how it may be improved and the cost be reduced for the general good.

I have the honor to remain,

Very sincerely, yours,

LEWIS M. HAUPT.

C

HEARINGS

BEFORE THE

U. S.,

COMMITTEE ON RAILWAYS AND CANALS

ON THE BILL

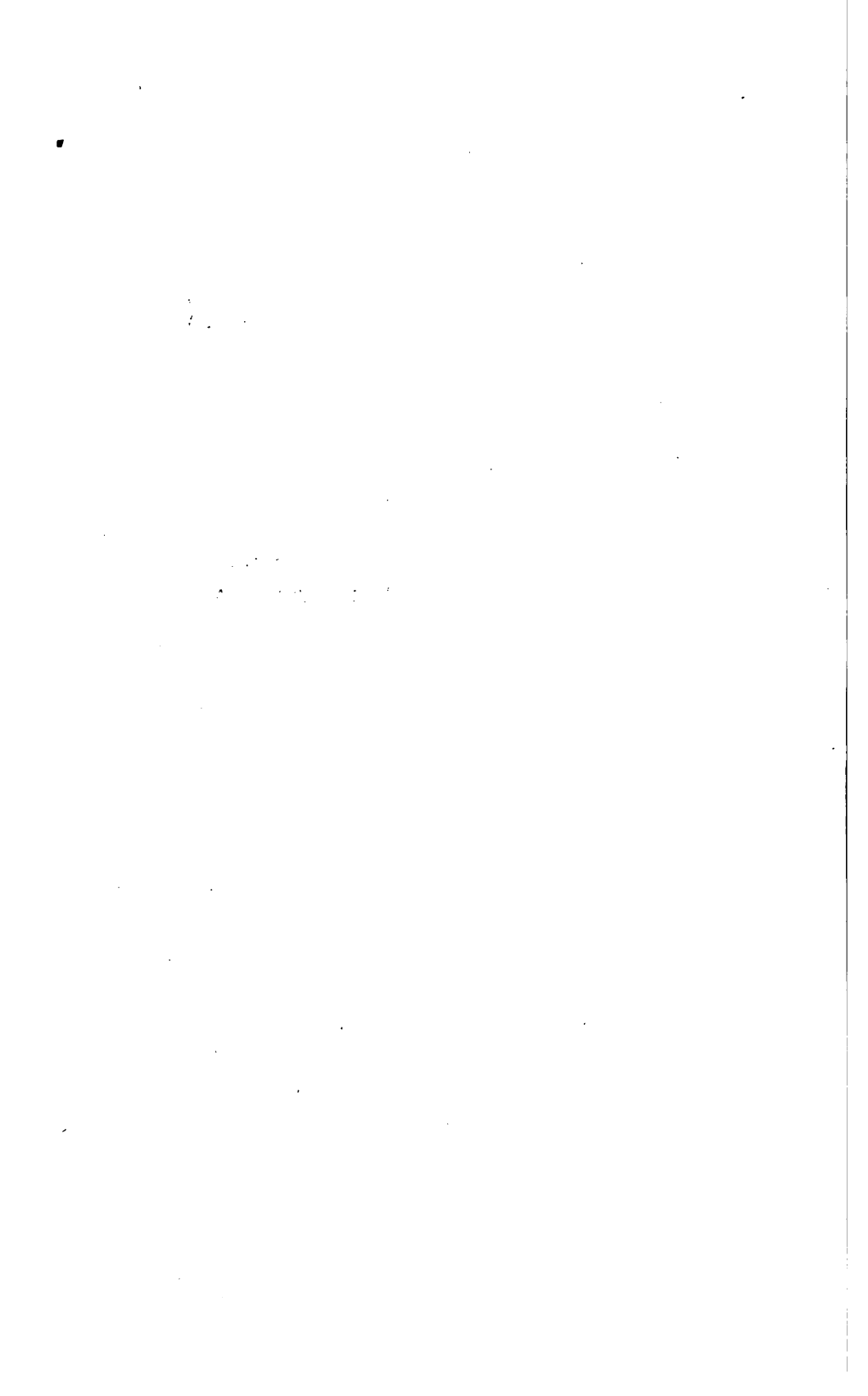
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TO ACQUIRE AND ENLARGE THE
DELAWARE AND CHESAPEAKE CANAL

WASHINGTON

GOVERNMENT PRINTING OFFICE

1909



a. S. March 27, 1909

SUPPLEMENTAL REPORT SUBMITTED BY MAJ. C. A. F. FLAGLER AS A PART OF THE HEARING ON THE BILL TO ACQUIRE AND ENLARGE THE DELAWARE AND CHESAPEAKE CANAL.

HEADQUARTERS THIRD BATTALION OF ENGINEERS,
Fort Leavenworth, Kans., October 8, 1908.

The CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C.

GENERAL: As directed by indorsement from the office of the Chief of Engineers, dated June 4, 1908, I have the honor to submit the following report covering the information desired by the chairman of the Committee on Railways and Canals, House of Representatives, in letter to the Secretary of War dated May 21, 1908. This information was as follows:

First. The cost of construction along the line of the present Chesapeake and Delaware Canal of a canal of proper widths and 25 feet deep at mean low water.

Second. The construction along the line of the present Chesapeake and Delaware Canal of a canal 16 feet deep at mean low water of proper widths.

Third. For a canal of 35 feet depth at mean low water, with revetments placed for final expansion to this latter depth, and also an alternative estimate for a canal of 16 feet depth with proper widths for that depth, estimate to include a permanent revetment upon one bank of the canal and a light temporary revetment on the other bank for removal in case of future expansion of the canal.

Fourth. The cost of construction of a ship canal of 35 feet depth and the cheapest line paralleling the present canal close to its present position, but without encroaching on any of the properties of the Chesapeake and Delaware Canal Company.

Fifth. The estimated value to the United States of the saving effected by utilizing the present route of the Chesapeake and Delaware Canal Company over what the cost would have been were canal to be constructed over this line under conditions precedent to the construction of the present canal.

To prepare accurate estimates for this report would require, as I stated verbally to the chairman, an accurate and carefully contoured survey of the land along the two routes considered. As the War Department had at its disposal no funds available for such survey, I was compelled to base my estimate on existing maps of previous surveys which do not even approximate the desired accuracy. The figures given below are obtained from the profile along the line of the Chesapeake and Delaware Canal as given in report of the commission (of which I was a member) on a waterway to connect the waters of the Chesapeake and Delaware Bay (printed in S. Doc. No. 215, 59th

4 TO ACQUIRE AND ENLARGE DELAWARE AND CHESAPEAKE CANAL.

Cong., 2d sess.), and which is fairly accurate, and from a profile shown on accompany tracing along alternate route to the south of the Chesapeake and Delaware Canal constructed from the local maps of the United States Geological Survey. These maps give only 20-foot contours and do not pretend to the accuracy desired for computation of excavation. It is my opinion, however, that the figures given in the estimate will not vary from the correct ones more than 5 per cent for canal prisms along the line of the present canal or more than 10 per cent along the alternate route.

The estimates desired, taken seriatum, are as follows:

1. Canal along the line of the present Chesapeake and Delaware Canal 25 feet deep at mean low water, with surface widths for future expansion to a 35-foot depth:

Estimate.

Purchase of land:	
903 acres high land, at \$250	\$225,750.00
750 acres marsh land, at \$100	75,000.00
Excavation:	
Chesapeake Bay from Pooles Island to Turkey Point, 3,229,350 cubic yards, at 13 cents	419,841.50
Mouth of Elk River and Chesapeake City, Md., 3,299,900 cubic yards, at 14 cents	461,986.00
Chesapeake City to point 33,000 feet east of same, 26,709,191 cubic yards, at 16 cents	4,272,470.56
From above point to Delaware River, 14,743,723 cubic yards, at 14 cents	2,064,121.22
Shore of Delaware River to present dredged channel, 2,680,500 cubic yards, at 13 cents	348,465.00
Revetment:	
Bank revetment, 103,100 linear feet, at \$6.50	670,150.00
Special revetment on deep cut where presence of quicksand is indicated	500,000.00
Settles, 2,000 linear feet, at \$20	40,000.00
Bridges, 1 railway and 6 highway bridges	925,000.00
Maintenance plant	702,500.00
Contingencies and engineering, 10 per cent of above	1,070,628.42
Purchase of works and franchises from Chesapeake and Delaware Canal Company	2,514,289.70
Total	14,291,202.40

The area of land, as stated above, is that actually required for a strip 1,000 feet wide. The canal company's land map shows very few places where their holdings even approximate 1,000 feet in width. The company states its land holdings at 8,000 acres; if correct, this is probably largely outside holdings of land for drainage basins for their summit water supply. As the proposed canal will have no summit level, these drainage areas will not be needed and some saving might be effected by the sale or exchange of surplus land.

2. Canal along the line of the present Chesapeake and Delaware Canal, 16 feet deep at mean low water, with surface widths for future expansion to a 35-foot depth.

Estimate.

Purchase of land:	
903 acres of high land, at \$250	\$225,750.00
750 acres marsh land, at \$100	75,000.00

Excavation:

Channel in Elk River and Back Creek, 464,520 cubic yards, at 14 cents	\$65,082.80
Chesapeake City to point 33,000 feet east, 23,966,846 cubic yards, at 16 cents	3,834,695.36
Above point to shore of Delaware River, 10,186,884 cubic yards, at 14 cents	1,426,183.76
Shore of Delaware River to 16-foot depth in Delaware River, 1,102,000 cubic yards, at 13 cents	143,260.00

Revetment:

Bank revetment, 103,100 linear feet, at \$6.50	670,150.00
Special revetment on deep cut where presence of quicksand is indicated	500,000.00

Jetties, 2,000 linear feet, at \$20	40,000.00
Bridges, 1 railway and 6 highway bridges	925,000.00
Maintenance plant	702,500.00
Contingencies and engineering, 10 per cent of above	860,755.19
Purchase of work and franchises from Chesapeake and Delaware Canal Company	2,514,289.70

Total 11,982,596.81

3. For a canal of 35-foot depth along line of present canal, and for a canal on same line 16 feet deep with suitable surface widths for the 16-foot depth, but with wooden revetment along one bank of the canal to permit easy removal in case of future operations for widening the canal at the surface suitably for a 35-foot canal; the revetment on the other bank to be of riprap, as recommended by the commission, and as included in above estimates.

Estimate for a 35-foot canal.

This is given on pages 7 and 8 of the commission's report as \$20,621,323.70, but a careful checking of the commission's computations has developed an error in calculation of 3,000,000 cubic yards excess. This error, at 14 cents per cubic yard, reduces the commission's estimate by \$420,000, or to \$20,201,323.70.

For the 16-foot canal, as specified, we have the following:

Estimate.

Purchase of land:

903 acres high land, at \$250	\$225,750.00
750 acres marsh land, at \$100	75,000.00

Excavation:

Channel in Elk River and Back Creek, 464,520 cubic yards, at 14 cents	65,032.80
Chesapeake City to point 33,000 feet east, 18,093,236 cubic yards, at 16 cents	2,894,917.76
Above point to shore of Delaware River, 8,358,994 cubic yards, at 14 cents	1,170,259.16
Shore of Delaware River to 16-foot depth in Delaware River, 1,102,000 cubic yards, at 13 cents	143,260.00

Revetment:

Bank revetment, permanent, 51,550 linear feet, at \$6.50	335,075.00
Bank revetment, temporary, 51,550 linear feet, at \$6	309,309.00
Special revetment on deep cut where presence of quicksand is indicated	500,000.00

Jetties, 2,000 linear feet, at \$20	40,000.00
Bridges, 1 railway and 6 highway bridges	925,000.00
Maintenance plant	702,500.00
Contingencies and engineering, 10 per cent of above	738,609.47
Purchase of works and franchises from Chesapeake and Delaware Canal Company	2,514,289.70

Total 10,638,993.89

6 TO ACQUIRE AND ENLARGE DELAWARE AND CHESAPEAKE CANAL.

4. Canal of 35-foot depth on line to the south paralleling the present canal, but not encroaching upon its territory; the line of this canal is shown on accompanying map.

Estimate.

Purchase of land:	
1,283 acres highland, at \$250-----	\$320, 750. 00
375 acres marsh land, at \$100-----	37, 500.00
Excavation:	
Chesapeake Bay to mouth of Elk River, 20,524,470 cubic yards, at 13 cents-----	2, 668, 181. 00
Mouth of Elk River to Chesapeake City, 10,055,000 cubic yards, at 14 cents-----	1, 407, 700. 00
Chesapeake City to point 9,600 feet from Delaware River, 58,891,415 cubic yards, at 16 cents-----	9, 422, 626. 40
Above point to shore of Delaware River, 4,738,810 cubic yards, at 14 cents-----	663, 433. 40
Shore of Delaware River to present dredged channel, 4,758,750 cubic yards, at 13 cents-----	618, 637. 00
Bank revetment:	
126,400 linear feet, at \$6.50-----	821, 600. 00
Special revetment where presence of quicksand is suspected--	500, 000. 00
Jetties, 2,000 linear feet, at \$20-----	40, 000. 00
Bridges, 1 railway and 6 highway bridges-----	925, 000. 00
Maintenance plant-----	702, 500. 00
Contingencies and engineering, 10 per cent of above-----	1, 812, 792. 78
Total-----	19, 940, 720. 58

5. The estimated value to the United States of the saving effected by utilizing the present route and property of the Chesapeake and Delaware Canal Company over what the cost would have been were a canal to be constructed over this line under conditions precedent to the construction of the present canal.

Useful excavation already made, 5,506,620 cubic yards, at 16 cents-----	\$881, 059. 20
Land holdings, 8,000 acres, at \$50-----	400, 000. 00
Telephone line-----	2, 000. 00
	1, 283, 059. 20

Less cost of:

Removing 3 locks, at \$5,000-----	\$15, 000
80,000 linear feet of bank revetment, at 10 cents-----	8, 000
44,000 perches of masonry, at 40 cents-----	17, 600
	40, 600. 00

Balance-----	1, 242, 459. 20
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The above figures are a very rough approximation, but they have been carefully considered and are the best available without a detailed survey. It is to be borne in mind that a large amount of excavation made by the canal company was placed on the banks as spoil and to form the towpath in the marshes, and is not useful excavation, in that it must be again handled in the construction of a ship canal.

Summary of estimates.

1. 25-foot canal along line of present canal, full widths-----	\$14, 291, 202. 40
2. 16-foot canal along line of present canal, full widths-----	11, 982, 596. 81
3. 35-foot canal along line of present canal-----	20, 201, 323. 70
16-foot canal along line of present canal, diminished widths-----	10, 638, 993. 89

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TO ACQUIRE AND ENLARGE DELAWARE AND CHESAPEAKE CANAL. 7

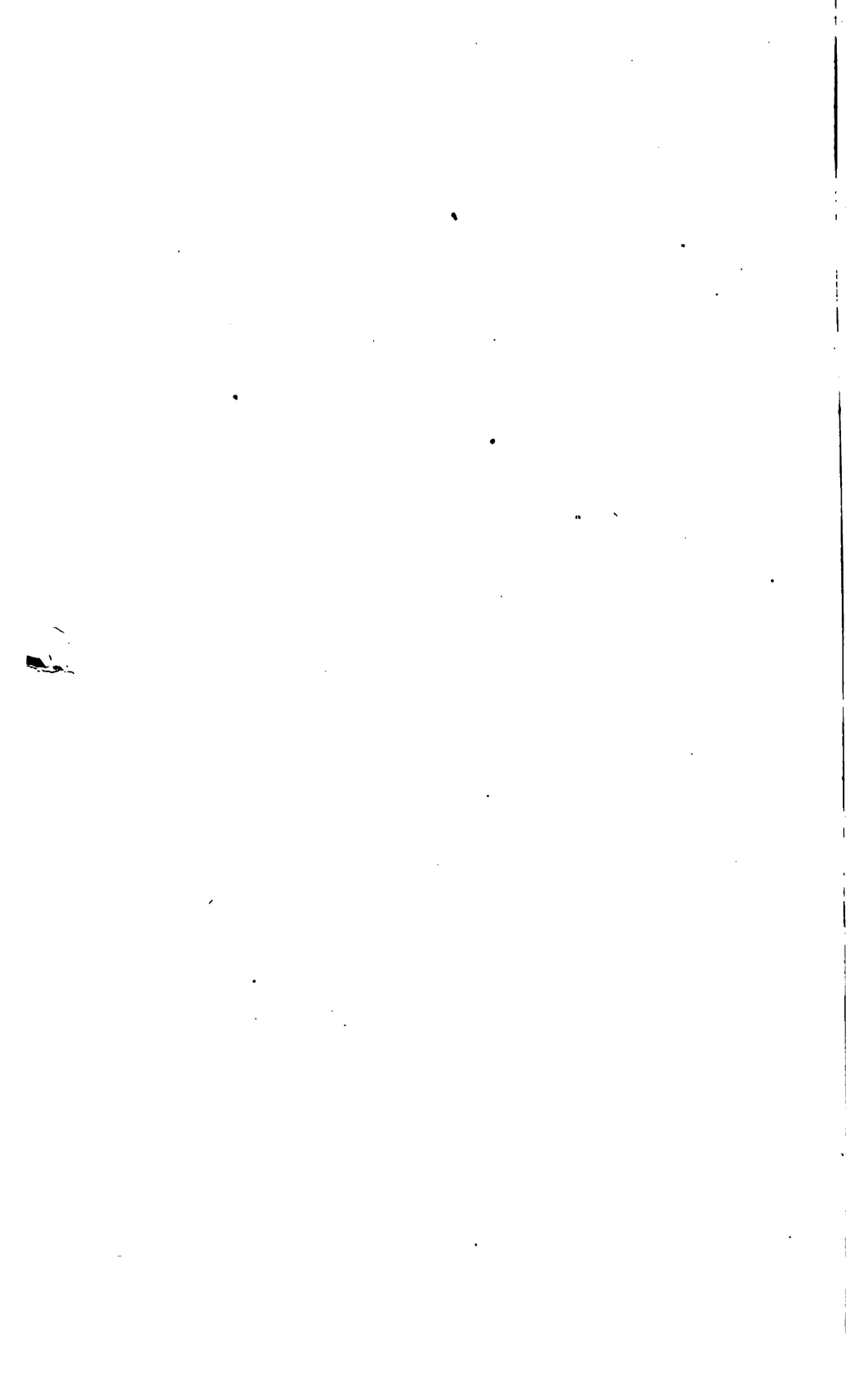
4. 35-foot canal along parallel line to south of present canal... \$19,940,720.58
5. Saving in value of work to the United States to be effected
by using present canal route..... 1,242,459.20

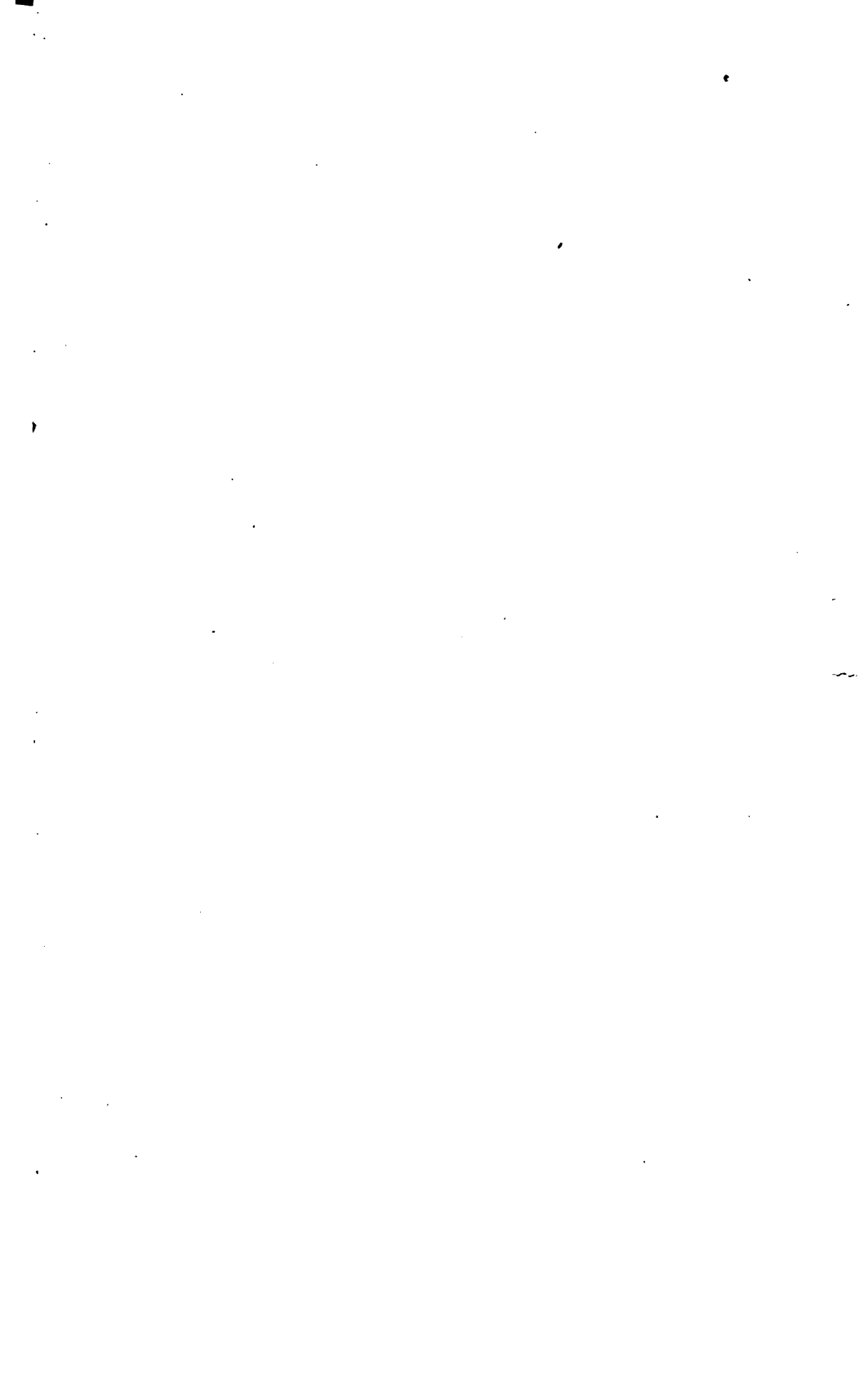
The accompanying tracing shows the two canal routes considered, the profile along the alternate southern route, and the cross sections adopted for the three depths considered.

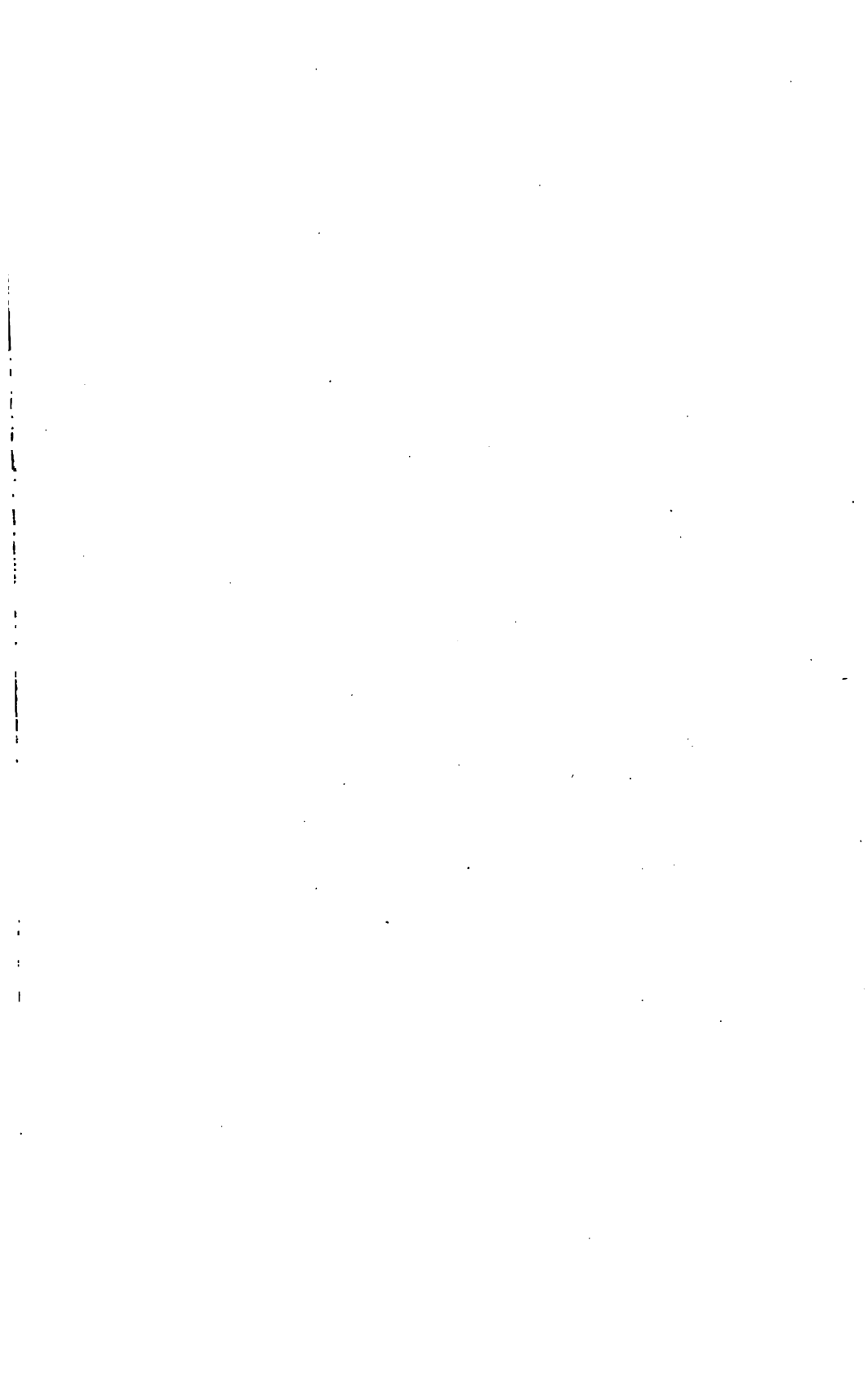
Very respectfully,

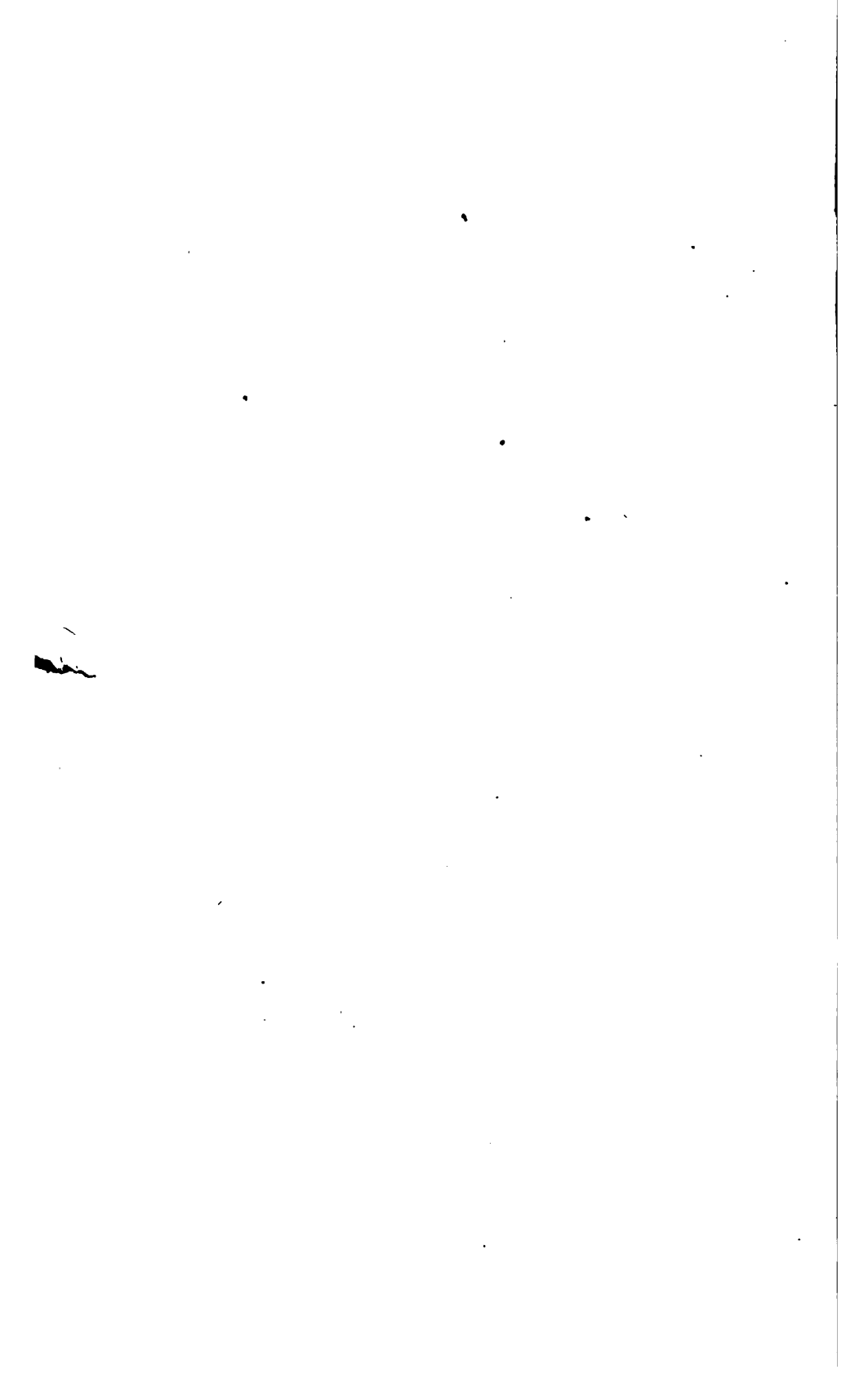
Your obedient servant,

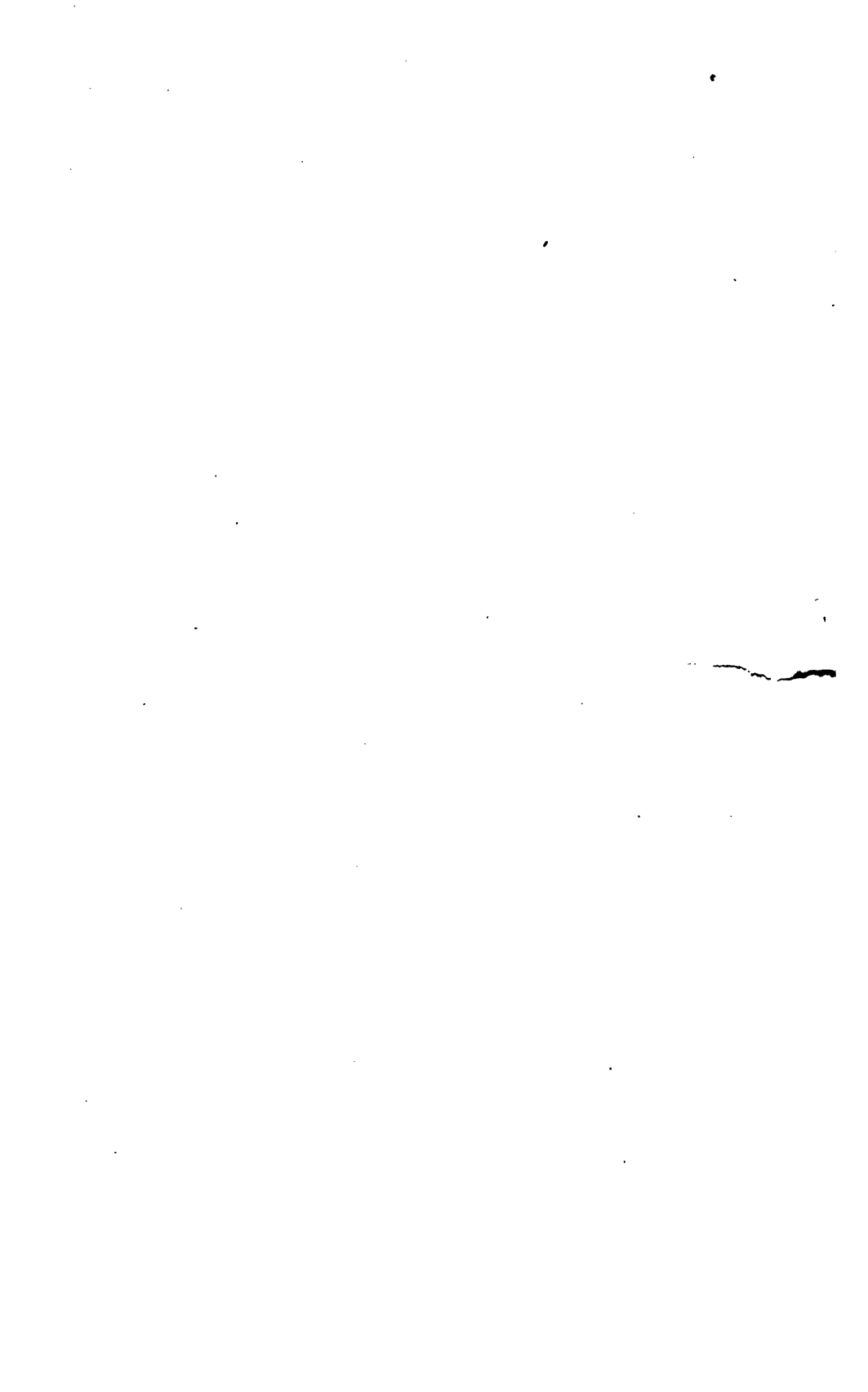
C. A. F. FLAGLER,
Major, Corps of Engineers, Commanding.

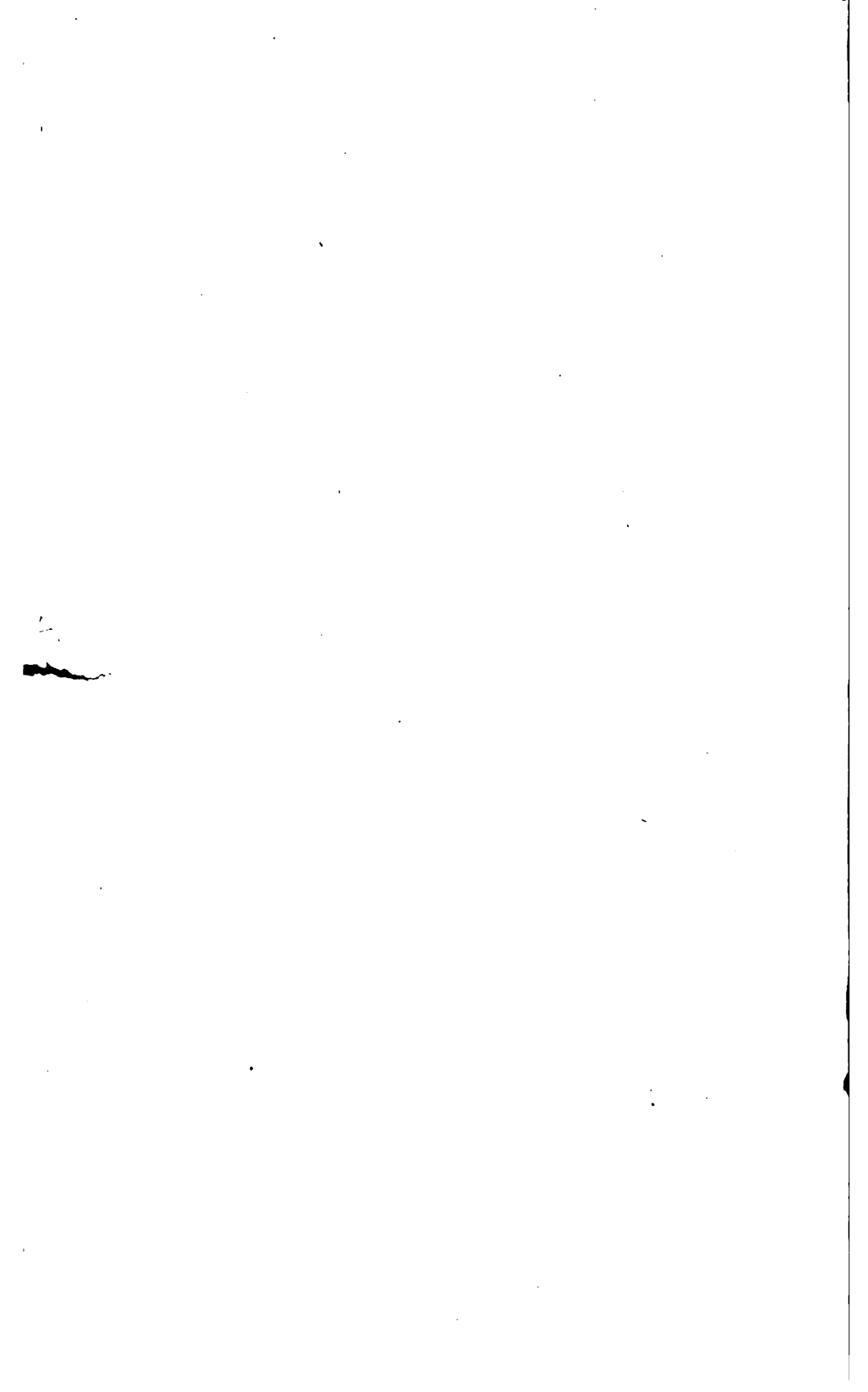


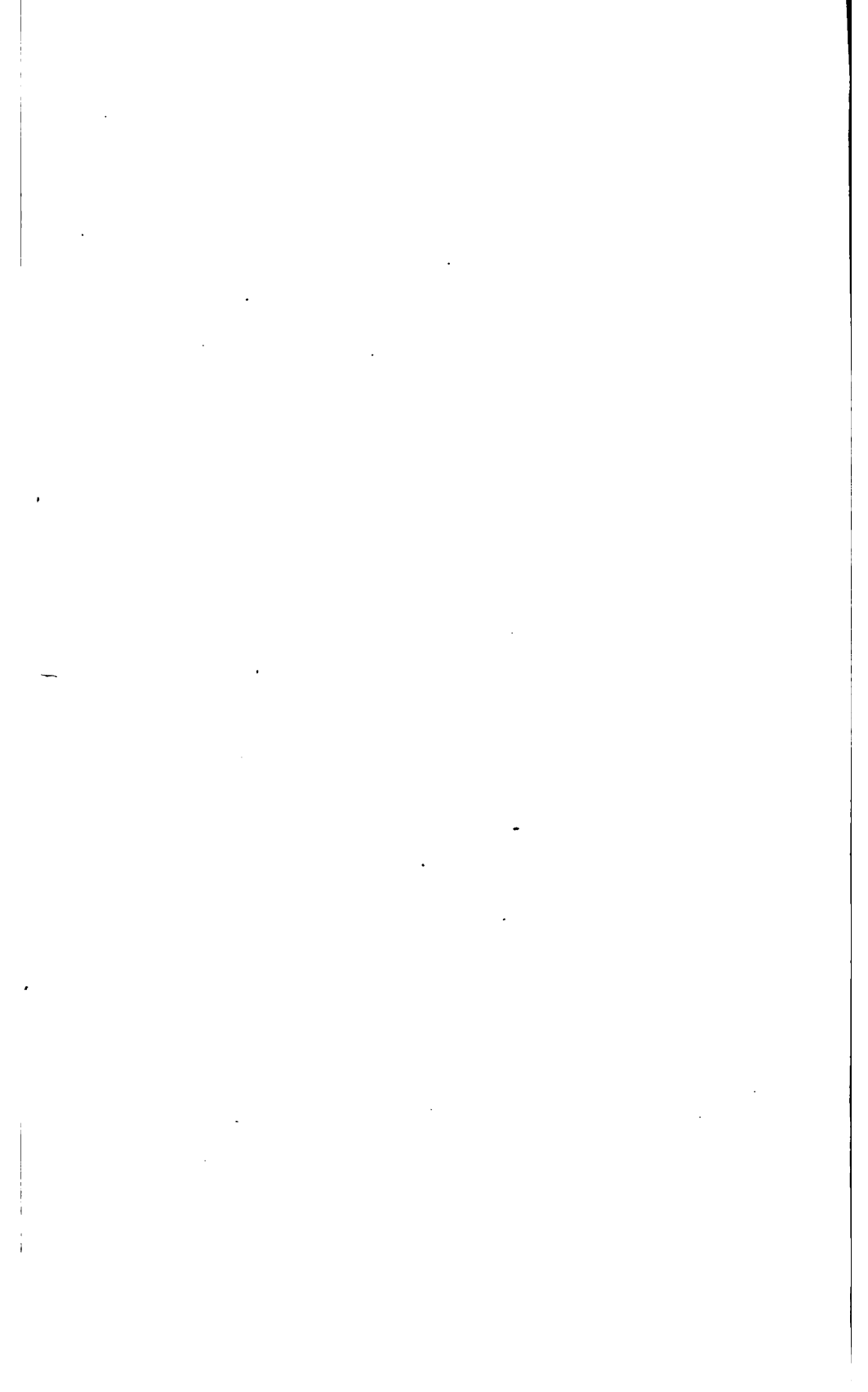


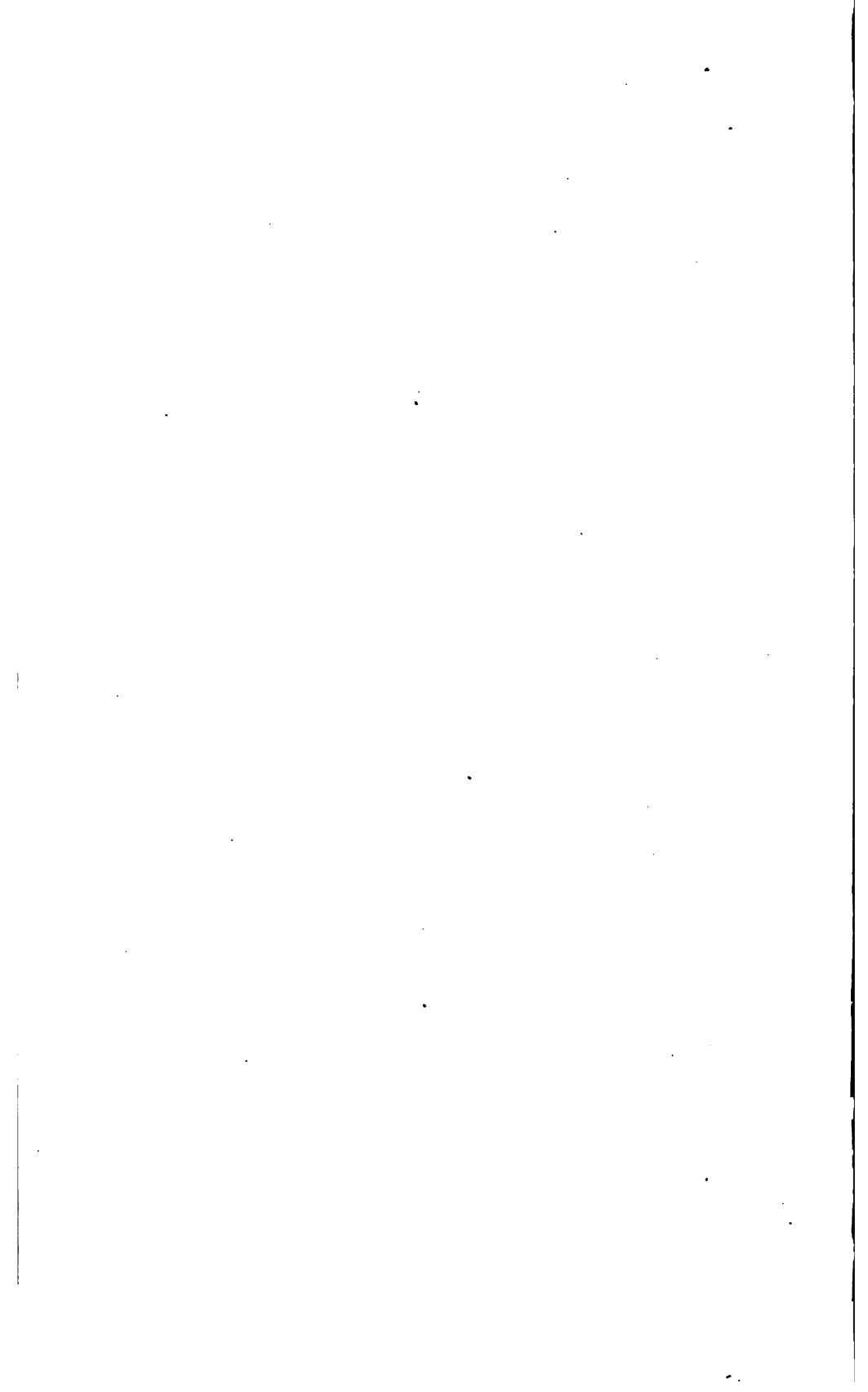


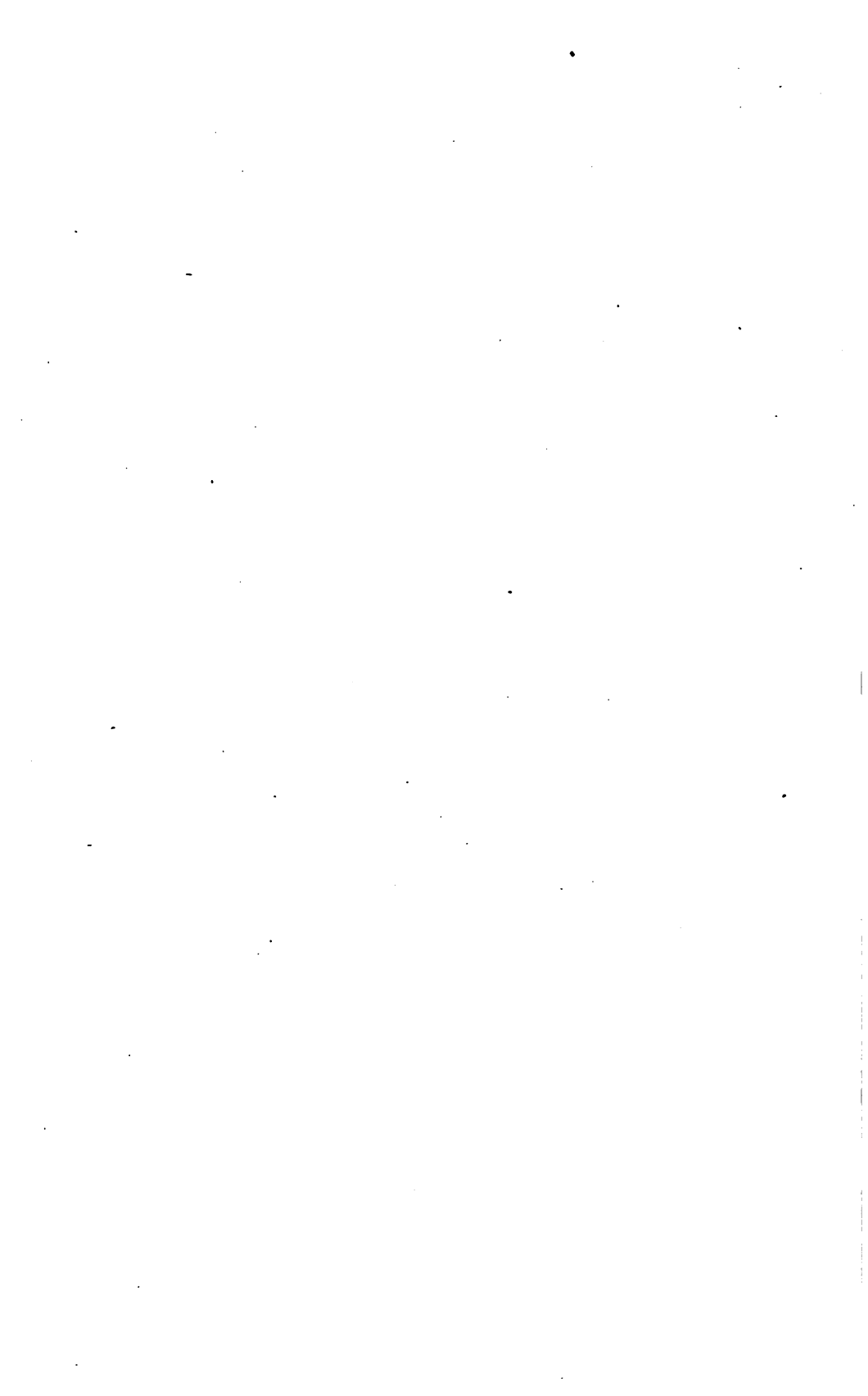


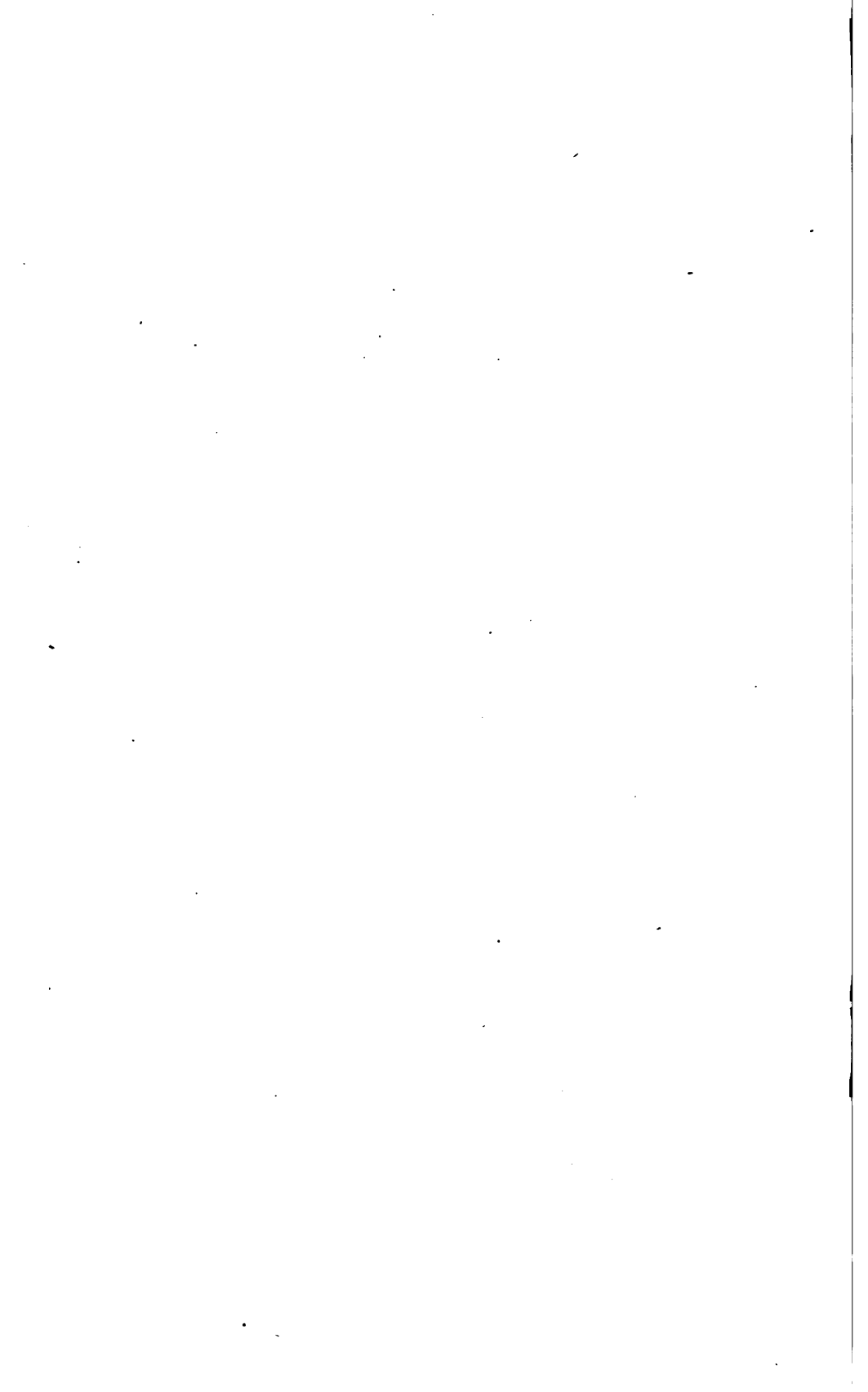




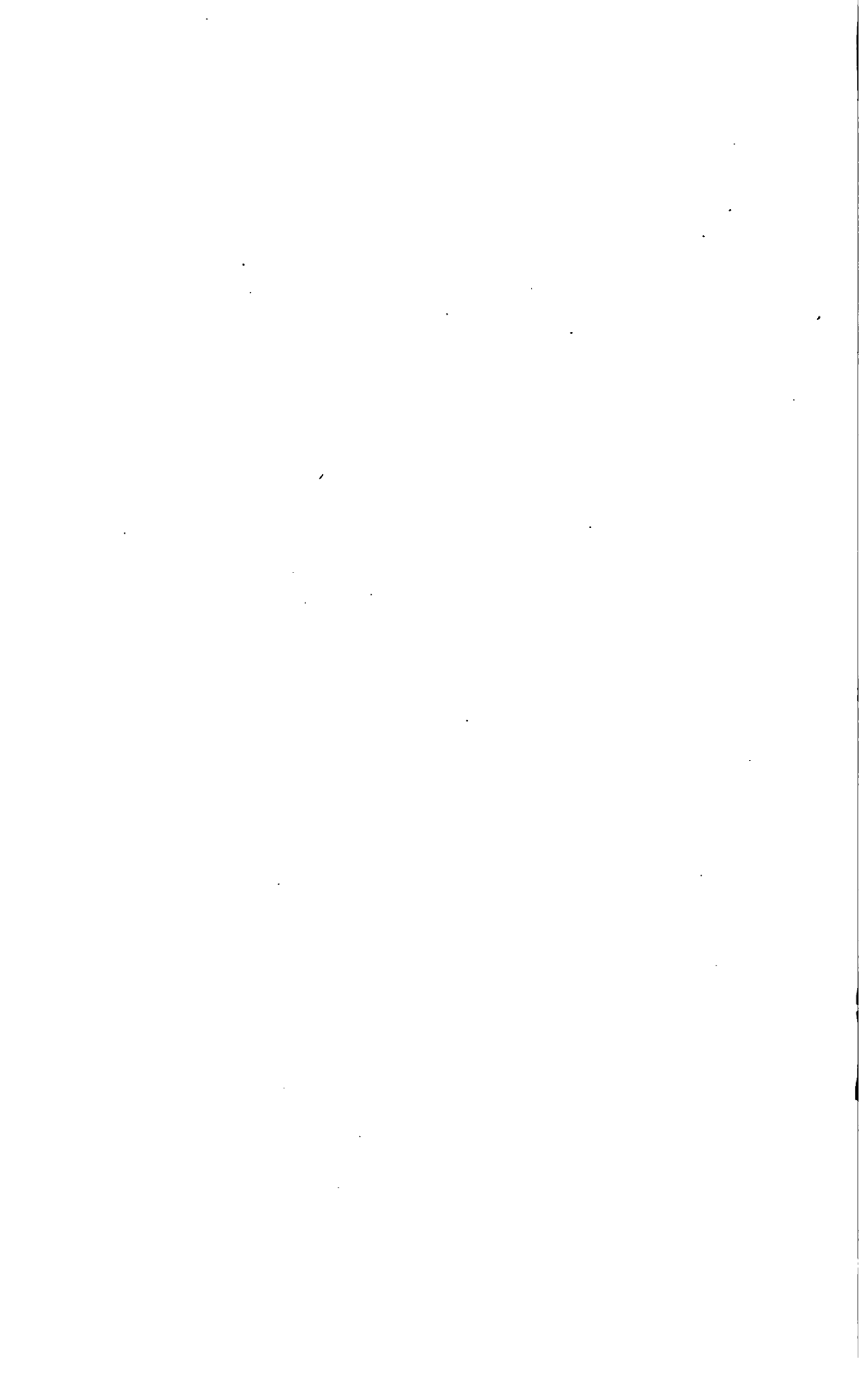






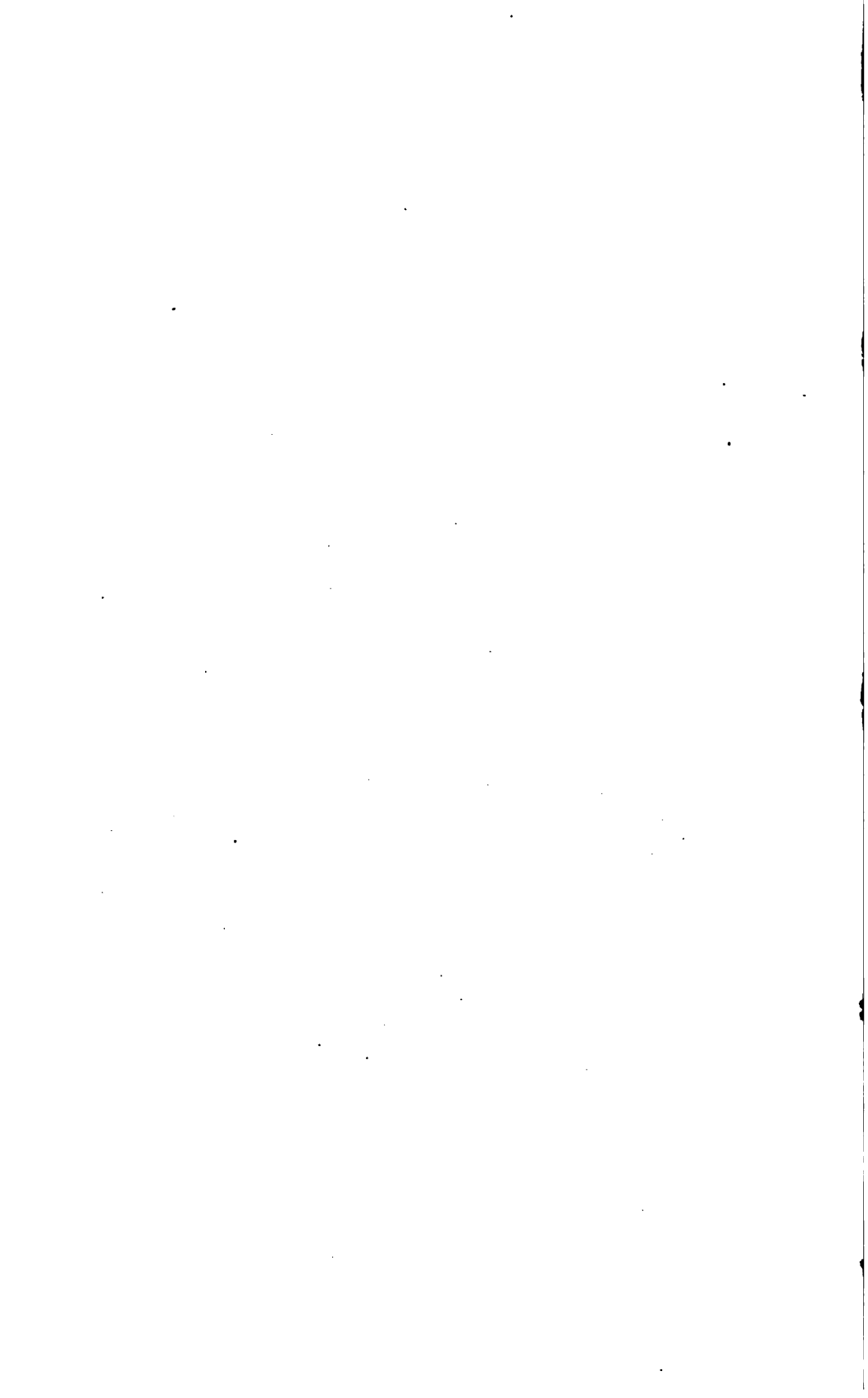




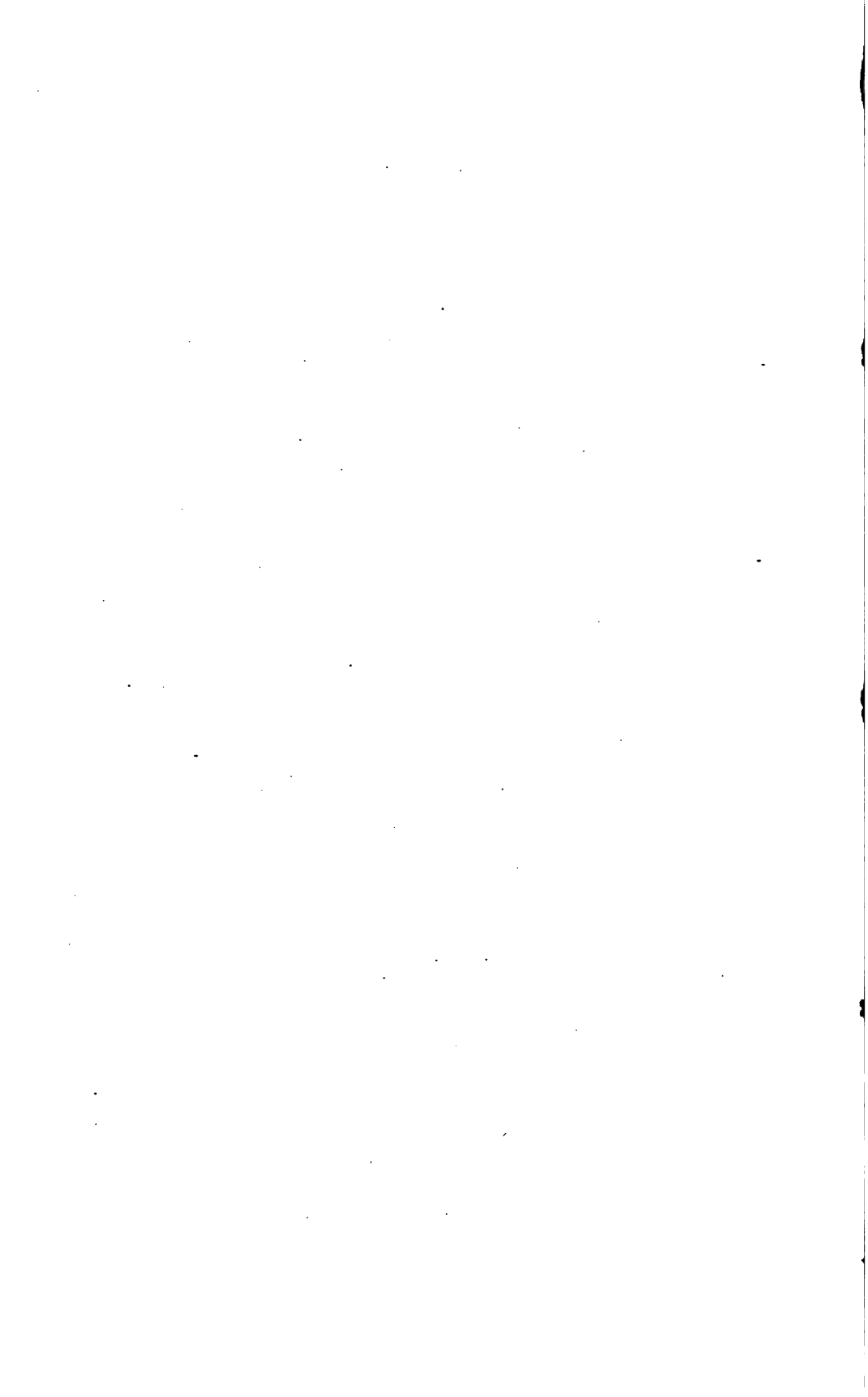


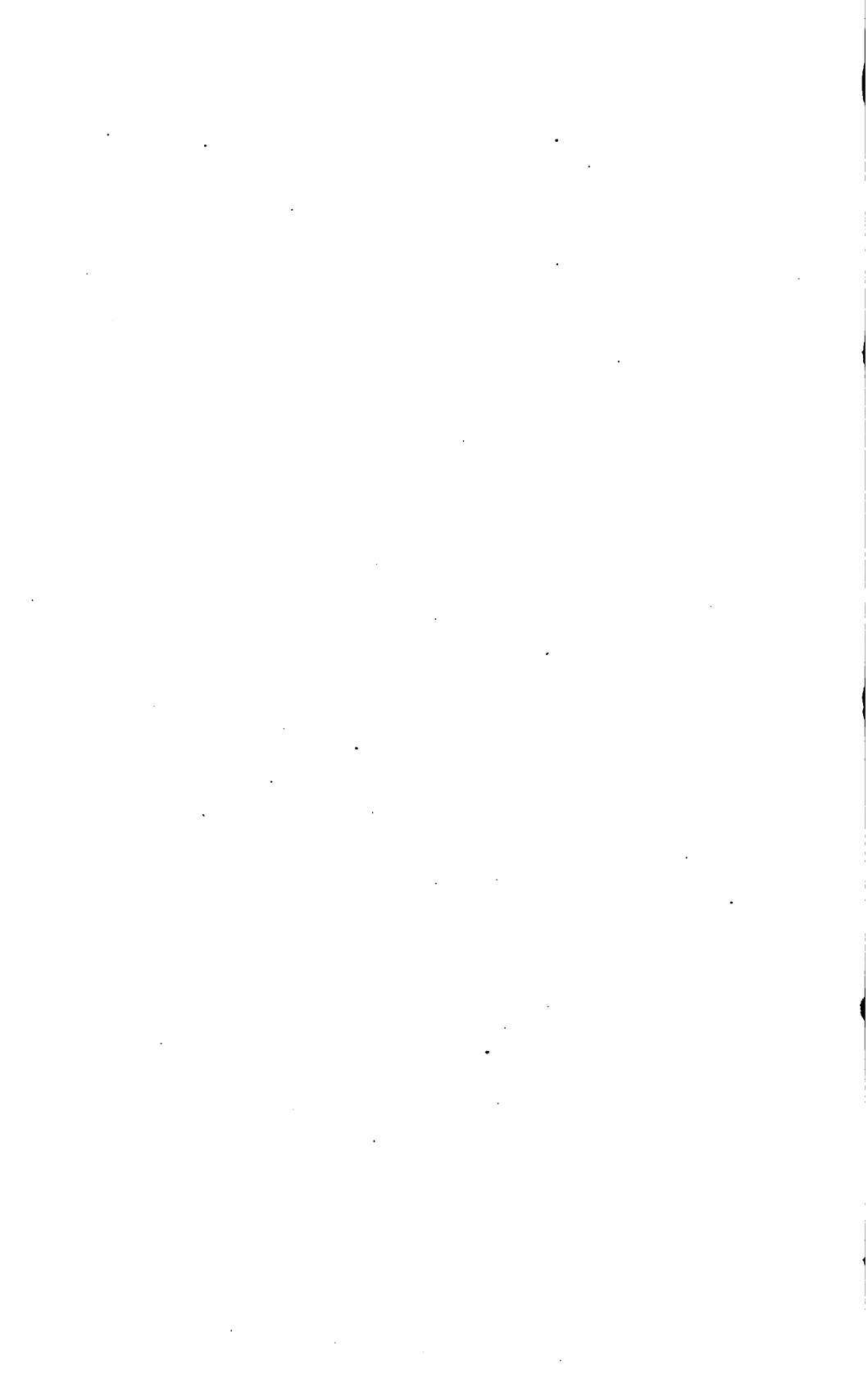


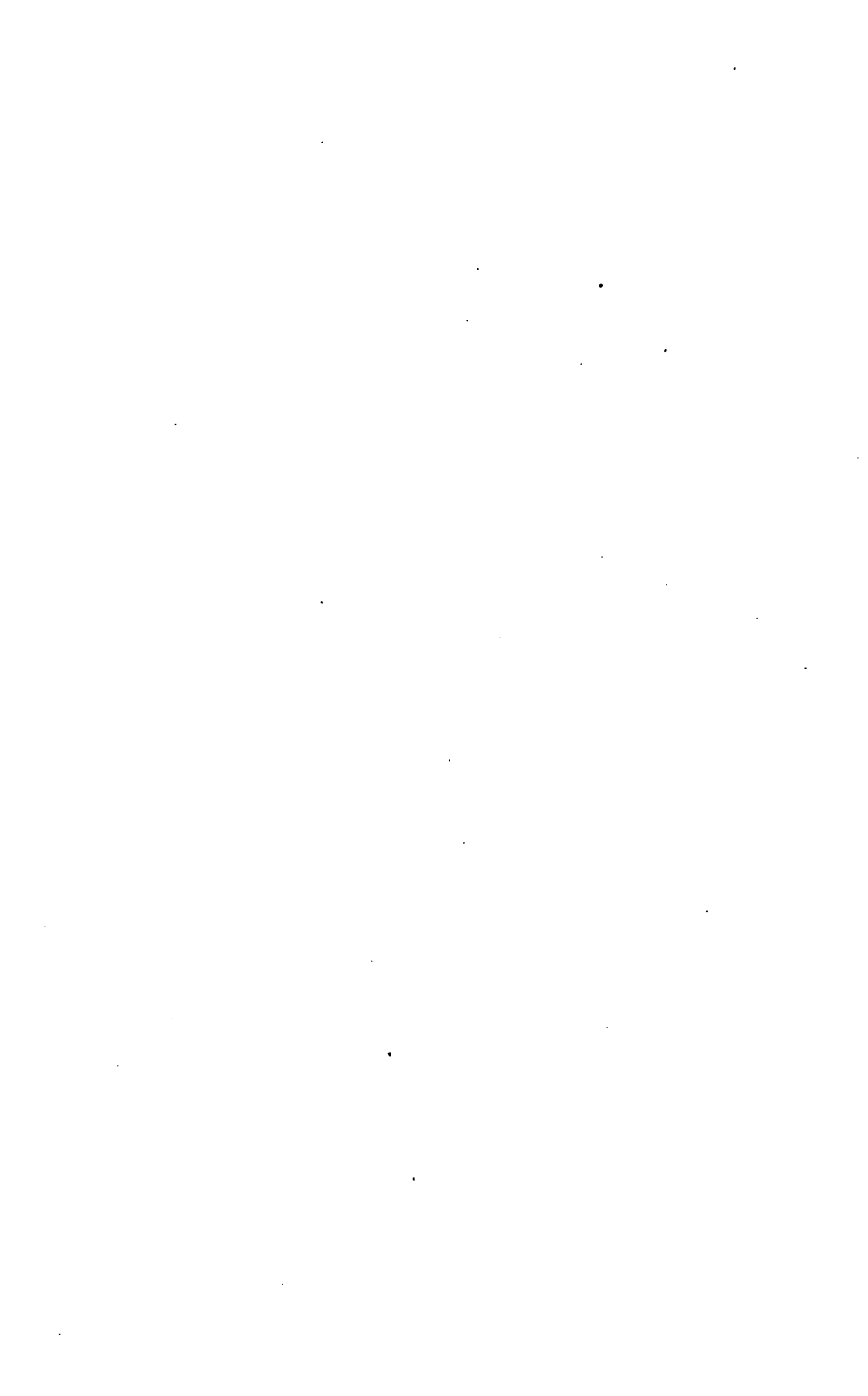


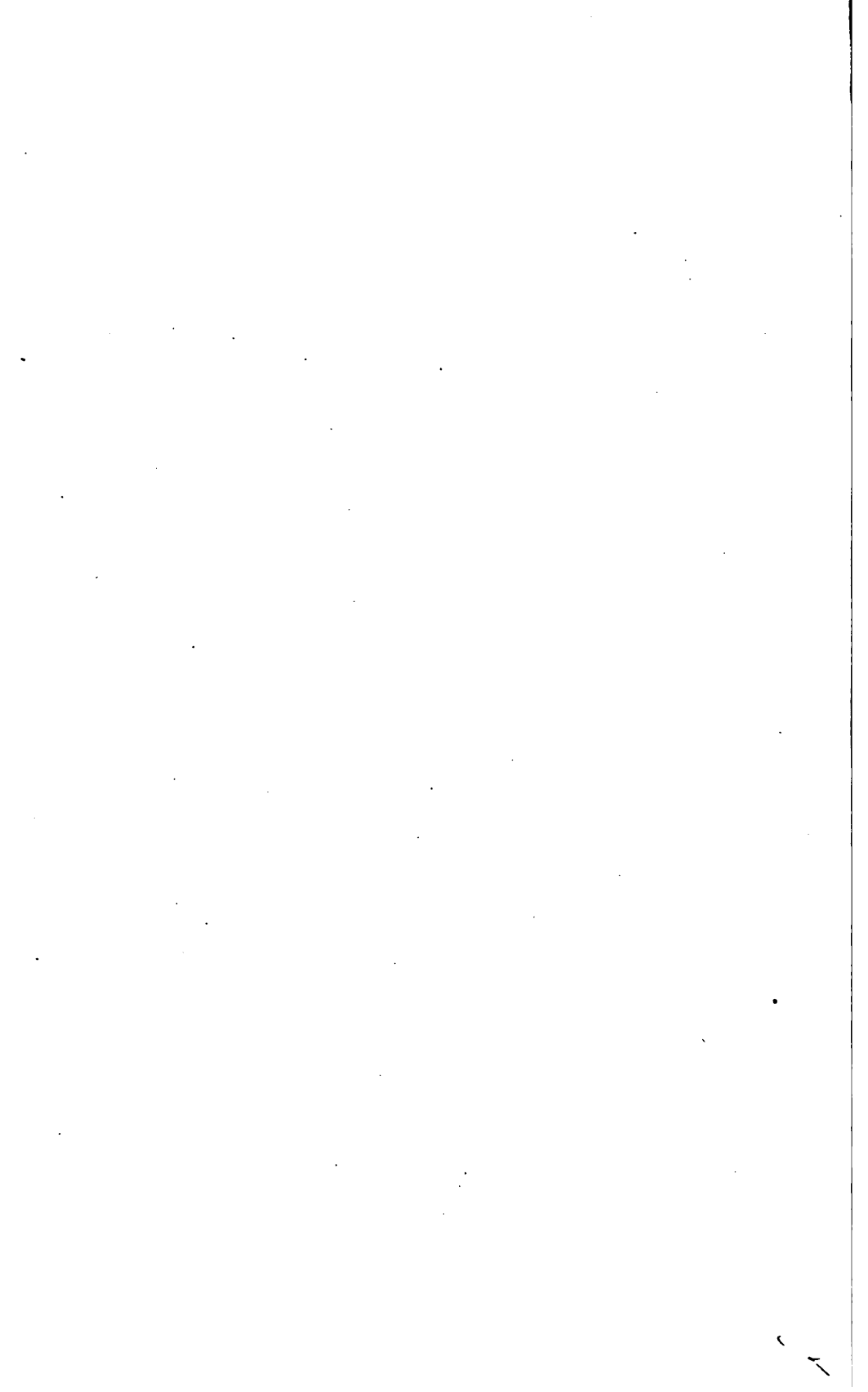




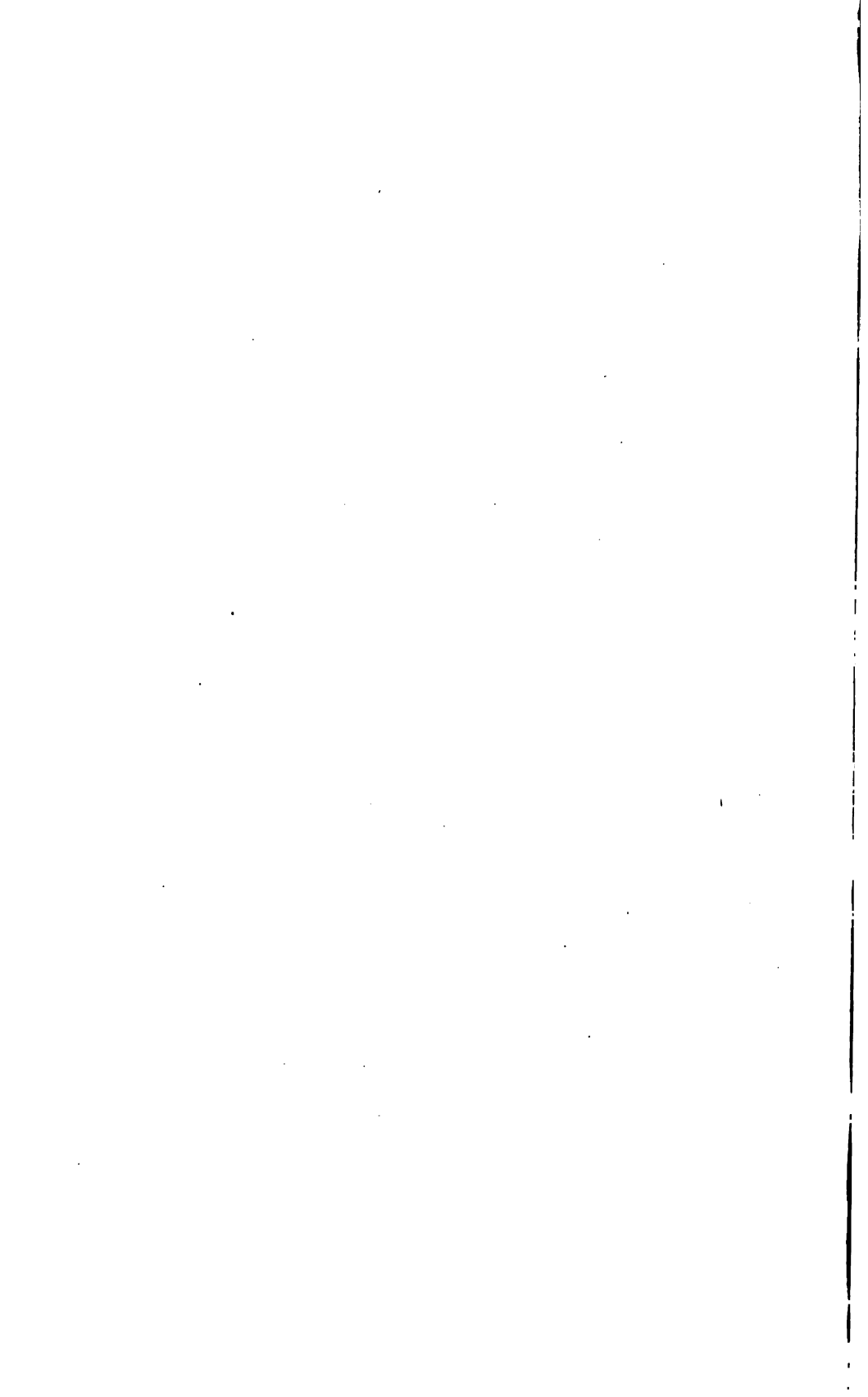


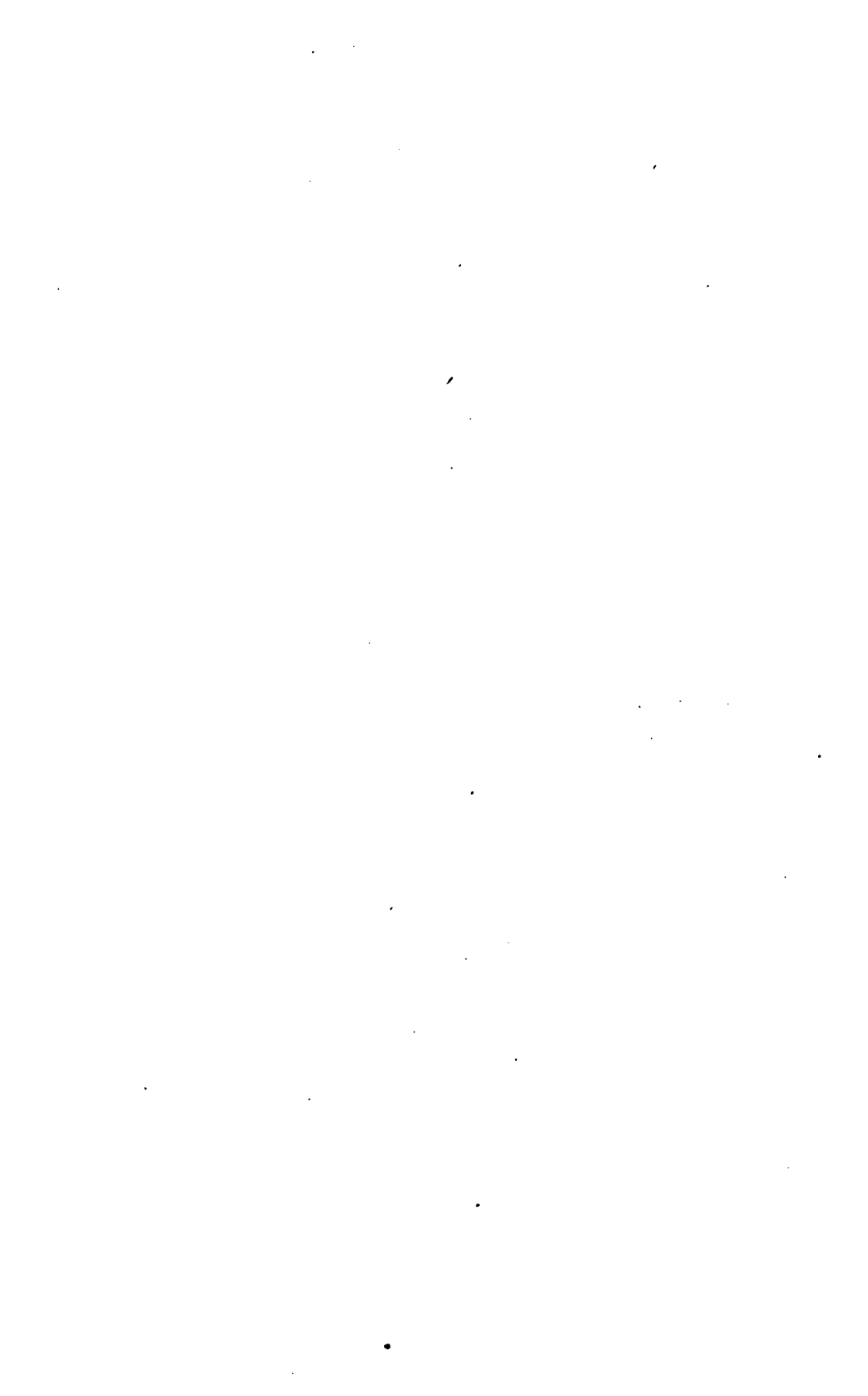


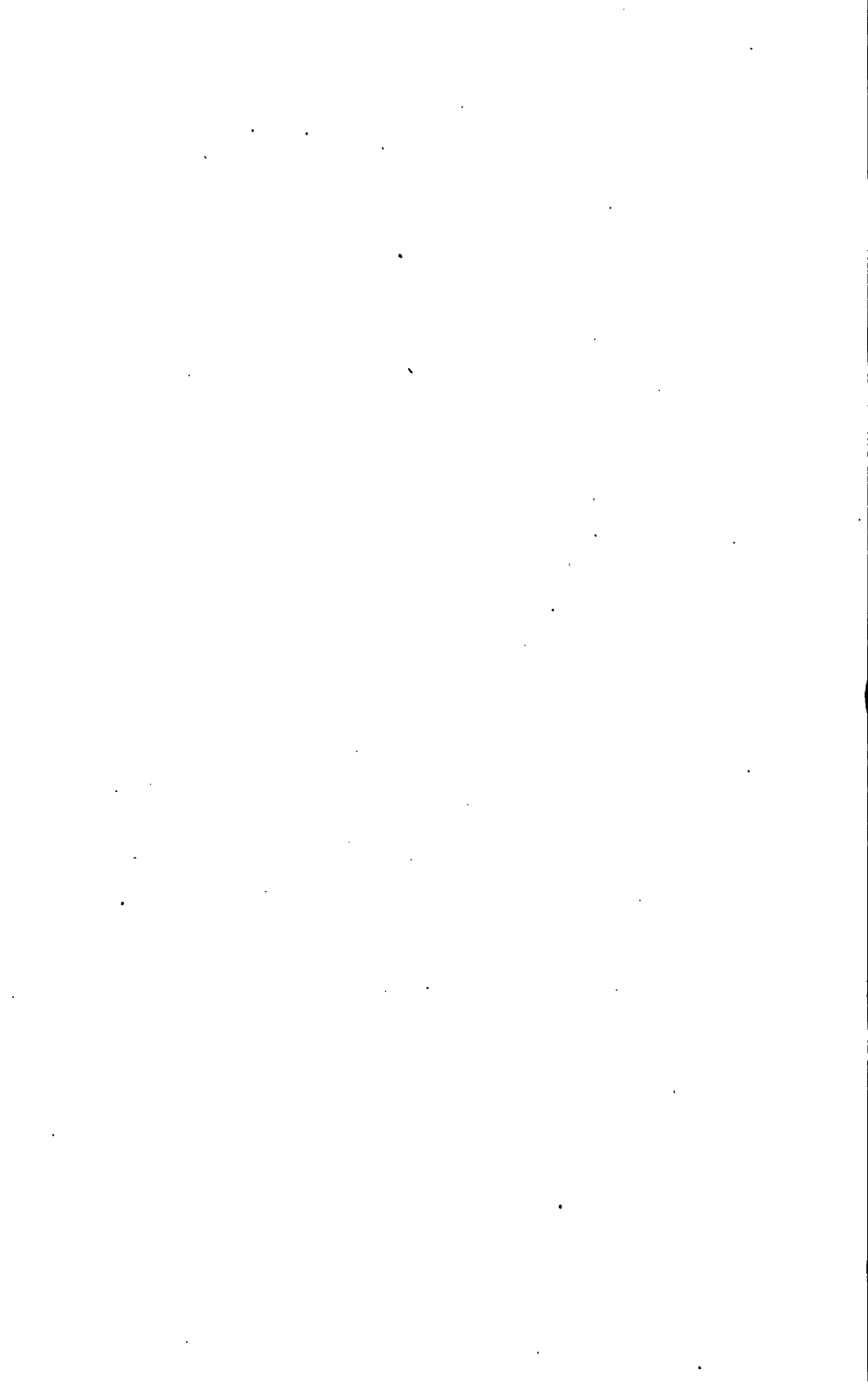












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